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**Experiencing and Knowing in the Fields
How Do Northern Thai Farmers Make Sense of Weather and Climate-change?**

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**Experiencing and Knowing in the Fields:
How Do Northern Thai Farmers Make Sense of
Weather and Climate-change?**

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A Thesis Submitted for the Degree of Doctor of Philosophy

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King's College London

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Abstract

Recent studies from the social sciences and humanities have interrogated the construction, spatialisation and governance of global climate knowledge through offering accounts of the intimate human-weather-landscape inter-relationship. This approach is currently lacking in Thailand, where the National Climate Change Master Plan's adaptation and communication strategies are largely infrastructurally-oriented, and science-driven, respectively. To rectify this situation, in this study a group of Tai Yuan (*Khon Muang*) farmers in Nan province, Northern Thailand, were selected to explore with them their weather experiences and interpretations, through a 13-month-long ethnographic study, a focus group, and a series of photo-elicitations. To answer how facts and ideas of climate-change were mobilised, framed, and communicated to these farmers, representatives of external climate-related organisations were subsequently interviewed.

The study found that weather was understood sensually, culturally and morally in relation to agrarian landscapes, Muang culture, Buddhist-animist beliefs, and farming practices: a winter of nostalgia; a summer of perseverance; and a rainy season of hope and fear. Unwelcoming changes in weather were believed to be local problems that required adjusting minds, worshipping deities, and reviving traditional beliefs and morality. NGOs tended to appreciate and respect these understandings by creating a hybridised local-science knowledge to empower and build resilience to external changes and injustices. Contrarily, most governmental and science-based climate organisations' communication strategies tended to impose, upon villagers, claims of global climate knowledge through technical terms, numbers, and climate policy, thereby redefining local weather conceptualisations. This hegemonic standardised knowledge reflects a modernist ideology that places lay Thai villagers at the periphery of global climate knowledge production. The Thai government's deforestation-maize-haze-global warming narrative exemplifies this standardised framing.

The thesis concludes that if climate adaptation projects in Thailand are to matter culturally to local people, knowledge pluralism needs to be taken into account and environmental narratives and communication strategies critically examined.

Table of Contents

Abstract	i
Table of Contents	i
List of Figures.....	vii
List of Boxes.....	ix
List of Tables.....	ix
Thai Glossary.....	x
List of Acronyms	xi
Acknowledgement	xii
Chapter 1: Introduction	1
The Intimate Universality of the Weather	1
The Plurality of Thailand's Climate Change.....	3
Knowing and Governing Climate.....	5
Layout of the Thesis	5
Chapter 2: Literature Review.....	8
2.1 A Non-Modernist Approach to Knowledge, Ontology and the Epistemology of Weather and Climate.....	8
2.1.1 A Non-Modernist Approach to Climate Knowledge.....	9
2.1.2 Ontology and Epistemology of Weather and Climate	14
2.2 The Place for Farmers and Their Weather	18
2.2.1 Vertical and Horizontal Dimensions of Place	19
2.2.2 Dwelling in the Plant-world	23
2.2.3 Dwelling in the Weather-world.....	25
2.2.4 Hybrid Climate-change	29
2.3 Summary and Research Questions.....	33
Chapter 3: The plurality of Climate in Thailand.....	37

3.1	Climate-change from the Perspective of Southeast Asia and Thailand.....	38
3.1.1	Climate Governance in Southeast Asia and Thailand.....	38
3.1.2	Climate Adaptation Studies in Agricultural Sector.....	39
3.1.3	The Human Dimensions of Climate Adaptation: The Thai Context.....	40
3.1.4	The Research Gap: Thai Climate Perceptions and Adaptations in the Agriculture Sector	42
3.2	Culture, Environment and Climate in Nan.....	43
3.2.1	The Underrepresented People of Northern Thailand	44
3.2.2	Muang Cosmology and Relationship with Supernatural and Nature	45
3.2.3	Representations of Nan.....	48
3.3	Environmental Movements and Organization in Nan	51
3.3.1	The Realities of Nan: Physical, Socioeconomic and Cultural Characteristics	51
3.3.2	Grassroots Environmental Movements.....	54
3.3.3	Key International Organisations Tackling Nan’s Food Security and Climate- change.....	55
3.4	Summary	57
Chapter 4: Methodology		59
4.1	Problematising Methodology.....	59
4.2	Ethnography: an Approach for Exploring, and Creating an Account of, Muang Chang Weather Stories	60
4.2.1	Ethnographic Research.....	60
4.2.2	Method 1: Participant Observation.....	62
4.2.3	Method 2: Life Story Interview.....	63
4.2.4	Method 3: Photo-elicitation	64
4.2.5	Method 4: Elite and Expert Interviews	66
4.2.6	Method 5: Narrative Analysis and Discourse Analysis	69
4.3	Summary	72

Chapter 5: Exploring Muang Chang	74
5.1 Muang Chang Village	75
5.1.1 Choosing the Field Site: Village M.....	75
5.1.2 Physical and Socioeconomic Characteristics	76
5.2 Winter.....	87
The Teacher.....	87
A Stranger in the Field.....	87
Harvesting 1: Rice.....	89
Busy Farmers, Becoming a Participant and Decisions About a Photographic Method	90
Bonding.....	92
Post-Rice Crops	93
Photo-elicitation 1: November 2013 to February 2014	98
The City-Rural Lifestyle Gap	98
Fruit Orchard and Farmer's Expectation.....	101
Interview with Local Authorities.....	101
5.3 Summer	102
Renewed Relationship.....	102
Harvesting 2: Soy bean, Fruits and Dry Season Rice	104
Photo-elicitation 2: March to June 2014	105
5.4 Rainy season	106
Wet Season Rice Planting.....	106
Photo-elicitation 3: July to October 2014.....	108
5.5 Winter.....	109
Lasting Relationships	109
The Students and Ajarn	109
Harvesting 3: Rice.....	110
Interviews with organizations	111

Focus Group and Final Photo-elicitation	112
Leaving	113
5.6 What I Missed	113
5.7 Summary	114
Chapter 6: The Making of Muang Chang.....	118
6.1 Place for Dwelling	118
6.1.1 Movements and Relations	119
6.1.2 Sensory Experiences.....	119
6.1.3 Comfort, Memories and Nostalgia.....	121
6.1.4 Cultural Belief and Rites	122
6.1.5 Taskscape	123
6.2 Flows and Relations	124
6.2.1 Rice, Fields and Farmers: Two Different Perspectives	125
6.2.2 Experimenting and Reviving Farming Knowledge	127
6.2.3 Forest and Maize.....	128
6.2.4 Flexible Farmers and Smart Farmers	129
6.2.5 Climate-change and Food Security.....	131
6.3 Making and Becoming Muang Chang	132
Chapter 7: Experiencing, Remembering and Interpreting the Weather in Everyday Life	
.....	134
7.1 Knowing and Experiencing the Flows of Weather and Seasons.....	135
7.1.1 Winter	135
7.1.2 Summer	141
7.1.3 Rainy Season.....	152
7.1.4 Experiencing and Knowing Changes in Weather and Seasons.....	159
7.2 The Muang Interpretation Of, And Responses To, Changing Weather Patterns	
.....	164
7.2.1 ‘Good’, ‘Bad’ and the Appropriateness of the Weather	165

7.2.2	Animist and Muang Cosmology Perspective: Hope and Fear	167
7.2.3	The Buddhist Perspective: Stoicism and Acceptance of Change	170
7.2.4	Moral Perspective: Re-evaluating Human Behaviour and Virtue.....	173
7.2.5	Local Blame and Local Agency of Change	175
7.3	Summary	176
7.3.1	The Weather-world of Morality.....	176
7.3.2	Ways of Knowing	180
Chapter 8: External Organisations and Local Climate-change Communication.....		182
8.1	The Nature of Climate-change Organisations in Thailand.....	183
8.1.1	Introduction to the Selected Organisations and Interviewees	183
8.1.2	Organisations' Objectives, Activities and Characteristics	185
8.2	Communicating Climate-change Adaptation: The Question of Information Claim, Language and Reception.....	189
8.2.1	Thai Terms for Communicating Climate-change	191
8.2.2	Maintaining Science as the Standard Platform for Communication (TMD, Nan TMD, CCKM, GIZ)	193
8.2.3	Embracing Local Knowledge as an Alternative Means for Communication (JK, RECOFTC, TEI, MARCC)	201
8.3	Summary	213
8.3.1	Organisation Characteristics.....	215
8.3.2	Translation of Climate-change Language.....	216
Chapter 9: Discussion and Conclusion.....		220
9.1	Summary of Findings	220
9.2	Discussion and Wider Insights	222
9.2.1	Lessons from Village M.....	224
9.2.2	When Knowledges Meet.....	226
9.2.3	Plurality of Knowledges and Community-based Adaptation.....	231
9.2.4	Language and Communication	235

9.2.5	Representativeness and Impact of the study	237
9.3	Contribution to Current Knowledge	238
9.3.1	Human and Cultural Dimensions of Climate-change	238
9.3.2	Contribution of Research Frontiers in Thailand.....	240
9.3.3	Methodology and Research Design	240
9.4	Future work	241
	Reference.....	243
	Appendix A: Ethical Clearance from King's College London.....	267
	Appendix B: Consent Form	268
	Appendix C: List of Participants at Village M.....	269
	Appendix D: Letter to Organisations	274
	Appendix E: List of Organisations, Interviewees and Their Job Positions, and Interview Topics	275
	Appendix F: Interview Questions for organisations	278
	Appendix G: List of Conferences and Seminars Attended	280

List of Figures

Figure 2. 1 The ‘exhabitant’ of the earth (A) and the ‘inhabitant’ of the weather-world (B) The weather, the earth and humans, as the ‘inhabitant’ of the weather-world, are in constant flux, and they are always mixing. This is unlike the ‘exhabitant’ of the earth where the land is clearly closed off from the sky and humans (Diagram taken from Ingold (2007), Figure 4).	26
Figure 5. 1 Map of Nan province (top) and location of Muang Chang district (bottom)	78
Figure 5. 2 Land use patterns of Muang Chang sub-district (Land Development Office 2013)	79
Figure 5. 3 A typical house in Village M.....	80
Figure 5. 4 Average climate of Nan province (1981-2006), measured at Ta Wang Pa station. Red line indicates average temperature, with range bars showing average maximum and minimum temperatures. Blue line indicates average rainfall.	81
Figure 5. 5 Village M’s main rice field (top); Lychee orchard grown on hill slope (bottom).	83
Figure 5. 6 A rice-harvesting machine (top); a spraying machine (bottom).....	86
Figure 5. 7 Example of a time-lapse photograph (taken on 10th November 2014). This spot captures the western side of Village M’s main rice field. A photograph of the same spot was taken every 2-3 days throughout 2014.	92
Figure 5. 8 Maize harvesting on a hill slope (top); The ‘barren mountain’ caused by deforestation for maize plantation (bottom). The coloured dots on the picture are bags containing collected maize.....	95
Figure 5. 9 Main rice field. On 28 th February 2014, the mountains could barely be seen due to haze pollution (top); On 4 th June 2014, the mountains could be seen again after rain and wind had washed away the pollution (bottom).	99
Figure 5. 10 Dum Hua (soaking the head with water) during Songkran Day, 14th April 2014.....	103
Figure 5. 11 A typical afternoon during the rainy season. Picture taken 30th July 2014.	108

Figure 7. 1 Pod of Pak Pu Ya [grandparent plant] of early 2014 (top) and of early 2015 (bottom)	140
Figure 7. 2 ‘Backs face the sky, faces face the earth’ bodily posture during dry-season rice planting. Note the hazy sky and blurry mountain in the background.	143
Figure 7. 3 A printed traditional Muang almanac for 2014. Content in the red box predicts individual and social affairs, in the green, predicts water and rain availability, and in black predicts rice yields. The red star indicates the name of the chief abbot of Cha Hang Temple. The blue start indicates the name and address of the publisher	148
Figure 7. 4 Seed sowing on Saturday 14th June 2014. The rain was delayed by at least two weeks. The soil was still hard and broken. The standing man, Dam, is using a wooden rod to make depressions in the soil in which his wife scatters seeds. ‘Luckily it rained, otherwise my hand would hurt even more’ [Dam 2098].	155
Figure 7. 5 Knowing the weather: in the background is a climate graph (from Chapter 5, Figure 5.4), showing average temperature and rain in the past 30 years.	160

List of Boxes

Box 2. 1 Definitions of weather, climate and its changes, and climate-change.....	11
Box 2. 2 Research Questions	35
Box 7. 1 The Making of Muang Almanac in Nan Province	151

List of Tables

Table 5. 1 Agricultural and cultural activities according to the three seasons: winter, summer, rainy season.	81
Table 7. 1 ‘Visibility’ of global warming and its manifestations at Village M.	145
Table 8. 1 Organisation cultures and degree of participation with local communities	189
Table 8. 2 Comparison between the English, official and technical, and spoken Thai terms of air, weather, climate, climate change and global warming	192
Table 8. 3 Summary of Communication Approaches of Eight Organisations.....	214

Thai Glossary

Ajarn	Teacher, lecturer, wise man
Muang	(1) City (in contrast to forest), (2) civilisation, (3) the name that people of Tai Yuan ethnicity call themselves
Pii	Spirit
Rai	Unit of measurement, equals to 1.6 km ²
Tevada	Celestial beings
Tuk/Dukkha	Destitution or 'troubled life'

List of Acronyms

CCKM	Climate Change Knowledge Management
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IPCC	Intergovernmental Panel on Climate Change
JK	Joko Learning Centre,
MARCC	Mekong Adaptation and Resilience to Climate Change, and
Nan ALRO	Agricultural Land Reform Office,
Nan MUN	Nan Municipality,
Nan ONRE	Nan Office of Natural Resource and Environment
Nan TMD	Nan Meteorological Office,
RECOFTC	The Regional Community Forestry Training Center for Asia and the Pacific
TEI	Thai Environment Institute), and one research or academic institution
TMD	Thai Meteorology Department,
UNFCCC	United Nation Framework Convention of Climate Change

Acknowledgement

This thesis represents the first milestone of my life. The journey for me to gain a PhD was planned a few decades back when my parents gave birth to me. They have always wished that I become a lecturer, serving my home country, Thailand. My mother and father made a long-term sacrifice and investment to send me to the UK in 2002 to start my A-level, then the Bachelor, Master and Doctoral degrees. Along this journey, I have grown to love teaching, unconsciously. And once I realised that, I wanted to make their dreams come true. This PhD thesis is dedicated for my parents who gave me life, and such endless and unconditional love and support. I feel very lucky and grateful. My parents have always told me that the knowledge gained from a decade of education in the UK is to be used to inspire students to help make a change for Chiang Mai, our city. And I will make it happen.

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Chapter 1: Introduction

The Intimate Universality of the Weather

Weather is never static. Since its birth with the Earth, it constantly undergoes changes every minute of every day, and through each season. Indeed, throughout human histories, weather has shaped and has been shaped by personal, cultural, social, environmental, economic, and political ‘affairs’ (Glantz 2003). But not only that. Atmospheric phenomena ‘intrude all too tangibly [into] our health, mobility, and economic well-being’, as well as existing as abstract scientific objects (Fleming et al. 2006, p.x). As part of modernity’s globalised and purified knowledge (Latour 1993), local weather has been observed instrumentally, and quantified and modelled, to constitute standardised knowledge of global warming and climate change (Weart 2008). This global knowledge then comes back to redefine dominant public definitions of the ‘normal’ or ‘stable’ atmosphere and its weather (Hulme 2008). In what Fleming et al. (2006) call ‘intimate universality’, the atmosphere, a site in which life binds and grows with the weather, belongs both to the natural and cultural worlds. Weather also is both a local and global phenomenon, not only a property of the public, but also of the experts.

Expert’s scientific findings confirm that large-scale climatic variability and change are threatening human societies (IPCC 2014). The impacts on ecosystems also entail a potential cultural loss, because the physical environment not only acts as the ground on which a community is physically and socially constructed. It is also a resource for cultural knowledge, ritual and innovation (Adger et al. 2012). But before proceeding to make an adaptative response to these changes in climate, more questions need to be asked: On what criteria and on whose terms are places and people vulnerable? Do global changes in climate matter for local inhabitants? And why? Do local perceptions and cultural knowledges about the local weather matter to external climate change project managers? Acknowledging the importance of cultural intimacy with the local weather, as well as critically examining the power and use of universal climate knowledge, helps to make climate adaptation projects matter culturally to local people and might avert maladaptation (Adger et al. 2012, p.116).

Following Adger and colleagues, there is a need to make visible, to culturally re-animate and re-vitalise intimate weather affairs, in addition and in contrast to scientific approaches which render weather as a mere external object impacting society. Nonetheless, even within social sciences and humanities disciplines, there is a limited, though growing, philosophical enquiry into what the weather means for people, and how it is historically and culturally bound up with human societies (see Barnes 2015; Brace & Geoghegan 2011; Crate & Nuttall 2009; Hulme 2015; Strauss & Orlove 2003). Anthropologist Tim Ingold, for example, questions whether the land which humans inhabit is separate from the weather elements and the sky, and whether these latter are considered material or immaterial, real or imagined (Ingold 2010, p.S132):

Where, we might ask, do we place wind and rain, sunshine and clouds, frost and falling snow, thunder and lightning? Is falling snow part of the material world, or does it only become part of that world when it lies on the ground? Is the wind on your face or the wind that blows down trees merely a figment of the imagination? Rain can turn a ploughed field into a sea of mud; frost can kill growing crops. How, then, can we say that a farmer's field is part of the material world while rain and frost are not?

(Ingold 2005, p.103)

For Ingold, a farmer is immersed in, and attuned to, the fluxes of the weather, and the meanings of the weather are constructed through the lens of farming livelihood. Ethnographic accounts of seven rice farmers in Asia compiled by UNESCO (2000) illustrate how much the weather animates, and is engrained in, farmers' everyday life: for example, how the 1998 El Niño made a Chinese farmer's visit to his relative a colourful journey, and how a drought reminded a Korean farmer of the Emperor's rainmaking ritual. Another study by Nimmanhemmin et al. (2001) shows how the 'poem of the twelve months' of each of the rice growing communities of Buddhist and non-Buddhist Tai ethnic groups in Southeast Asia describes the inseparable relationships between the growth of rice, the weather and surrounding environments, and cultural traditions and rituals.

The country of Thailand, one of the world's largest rice exporters (Muthayya et al. 2014), offers an opportunity to study such intimate relationships between farmers and the weather. In more recent years, Thai farmers have been hard-hit by unexpected floods and droughts (Chantararat et al. 2016; Thampanishvong 2015). While crop diversification and risk management, and technical and financial assistance, have been

proposed (ibid.), a study by Kerdsuk and colleagues (2012) cautions that adopting non-native drought-resistant rice species could lead to loss of a farmer's identity. This is Adger et al. (2012)'s mal-adaptation at work. Moreover, some northern Thai farmers are less interested in directly reducing physical climatic impacts, but would rather internalise any changes and proactively adjust in order to maintain resource availability, and their cultural identity and local knowledge (Forsyth & Evans 2013; Santasombat 2008). In terms of climate risk communication to farmers, Thampanishvong (2015, p.1) suggests that: 'the government also needs to effectively communicate with the public about the *dangers* of climate change. Farmers need to be *sensitised* and updated about climate conditions and the implications on their livelihoods and well-being so they realise the threats are severe, and *adapt in time*' (italics mine). The question is, what exactly do Thai farmers must learn about climate change that exceeds their existing knowledge? Below, I examine the significance of this quote.

The Plurality of Thailand's Climate Change

In Thailand, the past decade saw various stakeholders in Thailand such as the government, academia, corporates, nongovernmental organisations, civic societies and religious groups differently articulate their own realities of climate change. These views are not easily reconcilable.

The Office of Natural Resource and Environmental Policy and Planning (ONEP) under the Ministry of Natural Resource and Environment is the official governmental organisation responsible for climate change. Recently, ONEP's cooperation with the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, has resulted in the establishment of the Thailand Climate Change Master Plan (2012-2050). Citing the Intergovernmental Panel on Climate Change (IPCC) reports, the Plan recognises climate change as an important barrier to national economic development that is largely based on agriculture and natural resources (ONEP 2012, p.2). The Plan aims to enhance sustainability and help the country to pursue a low carbon society. While it promises good prospects for the agriculture sector, many marginalised voices are rarely heard (Lebel et al. 2011).

In 2011, the Thailand Research Fund published an IPCC-like report called Thailand's First Assessment Report on Climate Change 2011 (1st TARC) to assess and reflect the state of climate knowledge in Thailand. Reading the editors' introduction sheds light on their knowledge construction and governance. The editors of Working Group (WG)2

(Snidvongs & Chidthaisong 2011, p.4) contend that '[impact and adaptation assessment] requires processes *more than* the scientific methodology because of complexity and uniqueness of each system and sector', while the editors of WG1 (Limsakul et al. 2011, p.5) believe that 'adaptation...requires interdisciplinary knowledge and *trustworthy, precise and up-to-date information* for supporting policy decision-making and implementation...', (italics mine). Climate adaptation and mitigation policy, then, rely on knowledge that is standardised, and a methodology that embraces both the sciences and humanities.

What would a precise climate projection – for example that by year 2099 there would be an increase in day and night time temperature of between 2-5°C, and that of overall rainfall increases by about 10% (Masud et al. 2016) – mean for the Thai government and for farmers? And does this globally generated knowledge 'recognise and respect geographical and cultural differences in the ways different forms of knowledge come to be granted authority in public life'? (Hulme 2010b, p.562). Can farmers tell their own stories about how the weather changes in local surrounding? These are some of the questions that will be explored in this thesis.

Perhaps a religious perspective can offer an alternative way, *beyond* science, for talking about climate change and its causes and responses. A Buddhist monk, Venerable Prah Maha Vuthichai Vachiramethi of Thailand, teaches that the root cause of climate change is fundamentally the change in humans' worldview away from nature (Vachiramethi & Thamrongnawasawat 2007, pp.46–48; see also Seeger 2014). This is due to the incoming of modern science which treats nature as a mere object, and no longer as having any moral significance. The Venerable's teaching also implies that, first, this shift in values and paradigm needs to be corrected (Vachiramethi & Thamrongnawasawat 2007, p.56); i.e. to re-place humans as part of nature, not above it. Second, reducing greenhouse gases is only an 'end-of-pipe' solution. And third, the current national economy which the Climate Change Master Plan strives to protect, needs to be rethought. For the Venerable, a renewed moral economy, not more economic growth, is needed (Vachiramethi & Thamrongnawasawat 2007).

In the context of climate change, rethinking morality through Buddhist belief and practice in small communities (Darlington 2014), and rethinking human rights and ethics caused by unjust environmental narratives (such as Earth Net Foundation and Thai Climate Justice Working Group), is not new. But this is not explicitly documented

in Thailand's TARC. What can the TARC and IPCC therefore learn from these civic and religious groups?

Knowing and Governing Climate

Taking Ingold's points above, the first goal of the thesis is to consider the mundane weather as something full of subjectivities, and to put the weather at the centre stage in telling stories about farmers' lives. This not only provides a space for the weather to speak of its affects and intimacy to humans, but also brings farmers' ways of knowing the weather alongside that of scientists. Rather than comparing and validating different knowledges, the intention is to deconstruct these knowledges and to reveal their cultural dimensions and latent power. The recognition of knowledge plurality is fundamental to this thesis. I have therefore introduced the different realities of climate change as articulated by science, social science and humanity scholars, by the Thai government, farmers, a contemporary Buddhist monk, and nongovernmental organisations.

The second goal of the thesis then asks how does global climate knowledge move from abroad into Thai farming life and how is it framed by different groups? More importantly, how should it be responded to? If science informs climate policy, then what does Buddhist teaching do? Is local knowledge relevant for the implementation of climate adaptation? Understanding the place-specificity and cultural relevance of climate knowledges, adaptations and communication strategies brought together by diverse groups to a local place is central to this thesis.

Layout of the Thesis

In Chapter 2, I review non-modernist ontology literatures that see the world as relational and fluid. Accordingly, an agrarian landscape is where the worlds of humans, plants and weather co-mingle, and yet is simultaneously shaped by external powers, knowledges and the politics of, for example agriculture systems and climate discourses. I also introduce the specific terms 'weather and its changes', 'climate and its changes' and 'climate-change', which I use in particular ways. My first two research questions explore processes of identity- and place-making, and weather perception and meaning making in the context of agrarian livelihood and weather in northern Thailand. The third question asks how climate-related organisations circulate climate discourses at local sites.

In Chapter 3, I provide what climate means to different groups of stakeholders in Thailand, especially from the government, researchers, foreign travellers, the local people and external nongovernmental organisations. I explain the reason for choosing Nan province, northern Thailand, as my field site, in which my thesis builds on, and benefits from, the wealth of existing non-climatic ethnographic studies and civic environmental movements in Nan.

In Chapter 4, I describe a methodological approach for attending to the research informants' sensuous and mental engagement with the weather, and for co-producing weather stories. I describe the theories of ethnography, participant observation, narrative inquiry, and photo-elicitation. Additionally, expert interviews and discourse analysis are relevant for examining organisational practices and their climate discourses. Reflections on the application of methods and my research positionality are reported in Chapter 5, written as a research diary. These are woven together with descriptions of the field site, and my personal experiences of the weather and the seasons in the Muang Chang sub-district during the 13 months spent living with the farmers

Chapter 6 responds to Research Question 1 by answering questions about identity- and place-making. I show that Muang Chang is constituted by bodily movements and sensorial experiences with plants, weather and topography, nostalgic memories, and Muang cultural and religious beliefs. I also present how climatic hazards and the state's top-down agricultural regulation give rise to grassroots movements. By reviving traditional practices and knowledge, i.e., re-enacting the taskscape, these farmers demonstrate flexibility to changes in order to achieve their ultimate goal – food security.

Chapter 7 responds to Research Question 2 by answering questions about weather perceptions and meaning making. I describe the expectations and the actual experiences of winter, summer and the rainy season in terms of physical and emotional sensations. I also map out the various types of weather indicators such as plants and animals, as well as traditional and scientific weather forecasts used for making sense of weather (ir)regularities. Importantly, changes in the weather-world are explainable not only – or even most helpfully - from a physical perspective, but also from spiritual and moral perspectives.

Chapter 8 responds to Research Question 3 by answering questions about the circulation of climate discourses. As part of awareness-action programmes, the three groups of climate-related organisations I studied communicated climate facts and

narratives differently to respective participants. I show that organisations labelled as ‘climate service providers’ and ‘climate policy facilitators’ tend to impose their claims using global climate knowledge and national climate policy. The ‘climate story listeners’, by contrast, co-produce knowledge by respecting local weather knowledge alongside scientific knowledge. I discuss to what extent these communication strategies match local weather ontology, languages and livelihood practices.

Chapter 9 summarises the findings and discusses the wider implications of my research. I ask what an external national or global knowledge institution can learn from a small village in northern Thailand. There are certainly differences in worldviews, for example, in terms of causal agency, the possibility of governing climate, and the nature and role of moral responsibility. I also discuss how organisational practices can be thought of as an extension of hegemonic power, extending from the core to the periphery, and from the city to the hills and up to the sky. I end the thesis by explaining the original contribution my work makes to current scholarship, and propose future research directions.

Chapter 2: Literature Review

In this chapter I review literatures that serve to answer what the weather means for a lay person, and how does he or she know and experience it. The voices that comes from a lay person, rather than from a scientist, is used to critique the dominant Western and scientific view of weather, climate and climate change, thereby providing alternative ontology and epistemology. If weather knowledge is place- and practice-specific, then this requires paying attention to the surrounding environment and landscape that give rise to the bodily and sensual processes of knowing and experiencing weather. Weather knowledge, as set of external information implanted into heads, however, requires tracing its sometimes invisible and distant origins and networks. At a situated place, then, is where these different forms of knowledge intersect. What happens when they meet?

In Section 2.1, I critique the binary opposition of culture and nature as a philosophical stance and suggest instead a multiple, fluid world. Here, I also introduce three additional terms which are used in the rest of the thesis: ‘weather and its changes’, ‘climate and its changes’, and ‘climate-change’. In Section 2.2, I take the concept of place and space as a foundation for understanding the relations and flows of plant, weather and climate-change. In 2.2.1, I emphasise that place and landscape are fundamental to the existence of life, being and perception. At the same time, I acknowledge that it is penetrated by external socioeconomic forces. The same argument goes for plants and the weather, and their places (Section 2.2.2 and 2.2.3). They are the medium of perception, emotion and experiences. In Section 2.2.4, I examine what climate-change is, from the perspective of hybridity and assemblage. The literature gaps and research questions are presented in Section 2.3.

2.1 A Non-Modernist Approach to Knowledge, Ontology and the Epistemology of Weather and Climate

Throughout history, weather shapes and is shaped by personal, cultural, social, environmental, economic, and political ‘affairs’ (Glantz 2003). Given the malleability of the weather in human society, it is essential to question it critically. In order to make a philosophical enquiry of what it is in a broader category of ‘nature’, I adopt social constructionism as an ontological approach, more specifically, the construction-as-

philosophical-critique type, after Demeritt (2002). I accept realism's belief about the existence of physical nature, but I reject the premise that nature can be known independently of human experience and culture. Nor do I accept that there is a one directional causal relationship between nature and culture.

Instead, following anthropologist Tim Ingold, I believe that nature, first and foremost, affords human perception and experience, and thus life, growth and transformation. Nature is not a blank object that is encultured from a distance (Ingold 2000), but is where its dwellers become constituted, and vice versa. I also appreciate that the same nature is imagined and manipulated through languages and symbols for different purposes, but I do not see nature as purely relative or symbolic. Following the discipline of Science and Technology Studies (STS), the world and its spatial relations is composed not only of humans, plants and animals, but also of machines and objects, which are constantly defined and reconfigured by multiple ontologies, knowledges and frameworks. In other words, the world is a hybrid; at once local and global, natural, cultural and technical, and always more-than human (Whatmore 1999, p.33). The entanglements of nature and culture, and the relationship between nature, knowledge circulation and environmental governance are described in more detail in Section 2.2.

In sum, I adopt a 'mixed ontology' between realism and social constructionism. I see nature and its place as dynamic and multiple: an authentic, rooted one that is home for dwelling, and a porous, mobile one that is an object for manipulation through politics and hegemony. But I emphasise the existence and importance of physical nature and its textures because for people to understand the reality of nature materially and conceptually, they have to be physically interacting with nature in the first place.

2.1.1 A Non-Modernist Approach to Climate Knowledge

In the past decade, scholars, especially from social sciences and related disciplines, have begun to critically analyse the ontological and epistemological differences between that of weather, climate and climate-change (Barnes & Dove 2015; Crate & Nuttall 2009; Hulme 2009; Strauss & Orlove 2003). The weather can be experienced and known through daily observation and sensuous engagement in activities contextualised in livelihoods. By being in a situated place over time, these human-weather-landscape interactions form part of the emotions, imaginations, histories and social practices (Ingold & Kurtilla 2000). Weather constantly changes together with its culture, and in order to understand such changes, the socially constructed idea of climate is used to

create an order or regularity between human experiences with this chaotic weather, and their cultural ways of living (Hulme 2015a, pp.3–4). For example, in telling weather stories, the physical changes of the weather are articulated symbolically and linguistically with reference to place-specific expectations and memories (Cruikshank 2005; Horn 2007; Jankovic 2001). Similarly, changes in the physical weather can also be expressed in scientific terms, relative to a 30-year average of the weather of its location. The clear distinction here is that climate is quantitative, while weather is qualitative and is all about life:

Climate is an abstraction compounded from a number of variables (temperature, precipitation, air pressure, wind speed, etc.) that are isolated for purposes of measurement. Weather, by contrast, is about what it feels like to be warm or cold, drenched in rain, caught in a storm and so on. In short, climate is recorded, weather experienced.

(Ingold & Kurtilla 2000, p.187)

In either case, weather changes are benchmarked and made sense of culturally (science is a product of society, hence part of culture anyway) (Hulme 2008; 2015a). The flows of the weather have temperaments and immediacy (Ingold 2000), and its (in)stability is culturally understood by the idea of climate. More importantly, both the physical weather and culture do change, inevitably. Because of a paradigm shift in knowledge and culture, for example, the idea of climate that is used to make sense of weather then also changes, and so does our conceptualisation of changes in the weather itself (Hulme 2015a). The distinction between the terms ‘weather and its changes’ and ‘climate and its changes’ are summarised in Box 2.1. The phrase ‘and its changes’ denotes the inevitable, constant changes in the physical weather and culture.

Box 2. 1 Definitions of weather, climate and its changes, and climate-change

‘Weather and its changes’ (or changes in weather) refers to an instantaneous change of the physical atmospheric conditions that can be directly and immediately experienced through the senses, for example, seeing cloud and rain, hearing thunder sound, and feeling the heat. Secondary sources of experiences include materials and social practices, such as wearing certain clothes, and observing plant and animal behaviours. These experiences cannot exist without associated emotions and memories such as happiness, fear, or nostalgia. Experiences, objects, moods and practices make up the cultural meanings of weather in livelihoods.

‘Climate and its changes’ (or changes in climate) refers to a constructed idea used for making sense of weather changes in relation to a cultural way of living. For example, a warm day during winter interpreted by a farmer is judged to be good, bad or strange with reference to his or her personal, social and occupational memories and expectations. The same warm weather could also be compared against its long-term statistical standard, and then referred to as being statistically normal or abnormal. Climate and its changes correspond to the conventional use of ‘climate’ i.e. to put the chaotic weather in order.

‘Climate-change’ refers to an entity that evokes popular discourses of human responsibility, scientific claims, carbon economy, energy, climate policy, and so on. The term climate-change in this thesis replaces the popular term ‘climate change’ widely adopted in the media. The use of the term climate-change uproots climate and its changes from its cultural places, making itself a manifestation of seemingly unrelated objects, actors and ideologies.

There are differences in the change of both weather and climate that are constituted in, and emerge from, human culture, and the change in the conventional term ‘climate change’. Change of the latter is derived by scientific knowledge and instruments, not by experience. Through instrumental and statistical quantification and standardisation, the encultured weather is de-cultured and detached from its cultural settings (Hulme 2008). Although it is attributable to certain hosts of human and natural agency, it cannot be directly sensed as it is numerically derived and digitally produced. Change in this case is made ‘visible’ (Rudiak-Gould 2013) by globally circulating scientific knowledge and media that allows it to become a travelling idea or discourse that is ‘appropriated uncritically in support of an expanding range of ideologies’ (Hulme 2008, p.9).

The works of Demeritt (2002) and Hulme (2008) suggest that climate change is reassembled into a new arrangement that is not only a combination of weather elements but also of greenhouse gases, atmospheric processes, discourses, bureaucracies and texts (Head & Gibson 2012, p.701). In this view, climate change becomes an entity that is always greater than itself: it is a ‘hybrid assemblage’ that is ‘more-than-climate’ (Head & Gibson 2012, p.701). But what it has lost is its original attachments to its places and cultures. As shown in Box 2.1, instead of using the conventional ‘climate change’, I use the term ‘climate-change’, to denote this loss, as well as its malleability and associated ranges of narratives, similar to Hulme’s use of ‘Upper-Case Climate Change’ (Hulme 2009, p.327).

Henceforth, I use these three terms for the rest of the thesis. When I refer to the weather (and its change), I emphasise its physical atmospheric elements that can be immediately sensed. When I refer to climate (and its changes), I refer to the broader cultural lens that is used to make sense of the physical changes in weather. Lastly, climate-change is used to refer to the conventional politicised term found in scientific publications and mass media.

As discussed more in depth below, climate-change is ontologically and epistemologically different from the weather (Ingold & Kurtilla 2000). It is detached from local place and culture. ‘Ontological politics’, a term used by Mol (1999), questions the present ontology that adopts separatism as prior and asks instead how it is that we come to separate things in the first place. Similarly, in his book *We have never been modern*, Latour (1993) asserts that modernity’s desire for ‘purification’ of physical nature from culture, or politics from science, is based on a false belief. In fact, the present world is

more ‘contaminated’ and more entangled than ever. The world is neither social or natural, but socionatural and so are the weather and climate-change. This implies that certain institutional bodies have the power to define boundaries between nature and culture. In the case of climate knowledge, such separatism rests upon the exclusive power of a global institution like the International Panel on Climate Change (IPCC) (Hulme 2010b; Jasanoff 2010; Miller 2004a).

Institutionalisation and scientisation have created a managerial approach to environmental governance, making climate-change a deterministic, closed system that is impacting human society and must be fixed, as illustrated in Turner et al. (2003)’s equation: $\text{vulnerability} = (\text{exposure} \times \text{sensitivity}) - \text{adaptive capacity}$. It often underemphasises the cognitive, sensory experiences, historical, moral and cultural arguments of climate-change, and marginalises other forms of knowledge in understanding and managing environmental problems and resources (Adger et al. 2012; Castree et al. 2014; Demeritt 2006; Hulme 2008; Jasanoff 2010; O’Brien 2011). Because not all communities adopt the same nature-culture ontology or even the same cultural understanding of the weather, a community’s way of interpreting, understanding and responding to local weather changes would be different to the approach that the IPCC has attempted to define and universalize (Hulme 2010b). In other words, the required response to such a global problem – reducing greenhouse gas emission and adaptation to the impact of changes in climate – may not be viewed favourably among different groups. This mismatch results in climate-change becoming an impersonal object that ‘cuts against the grain of common sense’ of how one makes sense of the weather (Jasanoff 2010).

It suggests that the dominant scientific way of understanding climate and climate-change is suppressing other forms of knowledge, and there is a need to elicit the minority voices and knowledges that arise from living in changes in the weather (Adger et al. 2012; Barnes & Dove 2015; Crate & Nuttall 2009). To contribute in a small but growing research niche, and to help fill a gap in climate-change studies in terms of the human dimension, I attempt to respond to a simple, yet largely unanswered question: ‘how climate knowledge is known, remembered, experienced, embodied, practiced, made and modified in the context of everyday life’ in people’s familiar landscapes (Geoghegan & Leyshon 2012, p.57). To take this new research direction forward, Latour’s non-modernism, which emphasizes relations rather than separation, is used to deconstruct the established climate-change ontology, and defend and support place-

based weather knowledges. The non-modern ontology would ask how human societies continually evolve together with the weather, and the answer is not that climate-change is caused by either humans or natural processes. In the climate–culture dyad, which is thought as a state of continual cultural adjustment, both weather and humans co-create each other, and are made into each other (Hulme 2015a).

In summarising the differences between modernist and non-modernist approaches, Head and Gibson (2012) contend that while the former is interested in using scientific method to prove, fix and manage changes in physical climate, the latter is interested in how daily weather is known, remembered, experienced and practiced. The latter also gives importance to the moral, historical, and cultural arguments of the problem (Adger et al. 2012; Brace & Geoghegan 2011; Hulme 2014; O'Brien 2011). The approaches to managing and governing climate-change problems are also different. The former is rather top-down, universalised and requires structural change whereas that of the latter is localised, and requires humans as agents for change (Hulme 2011a).

I have offered social constructionism (Demeritt 2002), and a non-modern (Latour's) view as a way of examining and critiquing the relationship between nature/climate and culture. Here I show that a shift in ontology from scientific climate-change to humanistic changes in weather and climate helps to better represent the reality that society and its weather and idea of climate are co-constitutive of each other. It means that the everyday, sensory experience of weather is preferred as a focus of analysis to an objectively and statistically-derived climate. As Brace and Geoghegan suggest (2011), this entails that, first, climate-change is a hybrid social-cultural-natural phenomenon, and second, it is understood in the context of local social, environmental, economic and political contexts.

2.1.2 Ontology and Epistemology of Weather and Climate

Below I review examples from anthropology and human geography that contribute to non-modernist approaches to weather, climate and its changes, and climate-change study. The first part, ontology, examines what weather and climate means for different cultural groups, in what forms they exist, why they change and how they are responded to. The second part, epistemology, examines the different ways in which people come to know their weather and climate. These two sections are related because how we come to know things informs how we conceptualise them, and vice versa.

Ontology

In scientific terms, changes in climate are defined via scientific methods as a long-term change in the state of the climate, attributable to natural and/or human causes, especially greenhouse gases (IPCC 2014). As described above, the rise of institutionalisation and scientisation is partly a result of the role of science and technology in modern societies that are expected to be able to help identify causes and predict and prevent adverse natural disasters (Fleming & Jankovic 2011). But this is not the only definition of changes in weather and climate (Leduc 2014). Below, I present other conceptualisations of the weather by those who hold non-scientific understandings of the world.

For many individuals in both Western and non-Western communities, weather is not an external object that impacts on life (Barnes & Dove 2015; Crate & Nuttall 2009; Horn 2007; Strauss & Orlove 2003). Rather, weather is attached to place, emotions, identity, livelihood and local politics, and it can be as deeply intrinsic as a mode of existence (Brace & Geoghegan 2011; de Vet 2014; Head & Gibson 2012; Hulme 2015a; Ingold & Kurtilla 2000; Vannini et al. 2012). Therefore, changes in weather and climate deeply affect the moral and cosmological dimensions of livelihoods (Hulme 2014; Leduc 2014). For these people and societies, although there may be different causes of changes in the weather as shown below, it usually requires deep examination of self and society in relation to the physical nature, all of which are framed within respective cultural lenses.

The IPCC's quest to attribute and confirm the anthropogenic causes of the changes in climate raises questions of controllability, causation and responsibility. Among communities of 'sky-based' religious believers (Donner 2007), changes in the weather and climate, for example, glacier advances and retreats, are thought as reward (or punishment) from mountain deities and spirits for (dis)respectful humans (Allison 2015; Byg & Salick 2009; Cruikshank 2005; Orlove 2009; Paerregaard 2013). Within this understanding, the weather is not caused by greenhouse gases, and indeed is beyond the control of humans, unlike that identified by the IPCC. To receive or regain 'good' weather, people do not directly fix the atmosphere but rather have to behave and relate appropriately to the supernatural. Similar moral and religious responses to changes in weather in relation to deities and spirits have been documented in, for example, Papua New Guinea (Jacka 2009) and African communities (Eguavoen 2013; Roncoli et al. 2002; Tschakert 2007).

In some communities, change in weather and climate were thought to be directly caused by humans, unrelated to the supernatural nonhumans. In the Marshall Islands in the Pacific, for example, their climate is their cosmos; its stability brings order to humans in relation to society (Rudiak-Gould 2012). The decline of society and environment, as well as climate, is believed to be caused by the local Marshallese themselves for not preserving their own traditional culture and surrendering it to modernisation (Rudiak-Gould 2012). Similarly, Kuruppu (2009) finds that re-celebrating local culture and religion, the adverse changes in climate could be reversed. Nevertheless, as introduced above, in some modern secular cultures, the role of morality in climate-human-deity relationship is fading against the rise of scientific knowledge (Fleming & Jankovic 2011).

It should be noted that in non-Western societies, there can be multiple and complex agencies of change, which as the examples have shown, can be deities and/or humans. But regardless of the causes, what is more important is the subjective dimension of responsibility. Unlike some Western societies which tend to objectively identify causes and seek to engineer the climate directly (Vaughan & Lenton 2011), some non-Western societies are more reflexive of individual morality and social responsibility. It is, therefore, the minds and behaviour of humans themselves, not the atmosphere, that need to be fixed. Cultural values and morality, for example, are often neglected in the current climate adaptation research and projects (Adger et al. 2012; Orlove 2009).

Epistemology

The ways in which people come to know changes in weather and climate are just as diverse as the beliefs about them. In contrast to the scientific epistemology that nature can only be known by empirical measurements using direct observations and standardised instruments, Eliza de Vet (2014), for example, argues that people come to know their immediate weather through daily life and continually interpret and adjust this knowledge through cultural practices and imaginations. Several factors such as age, lifestyle, identity, occupation and the surrounding environment, influence climate norms and expectations, and hence the sensitivity to changes in weather and climate. As Hulme et al. (2009) have shown, regardless of the perspective from which it is viewed – physically, statistically, culturally or psychologically – climate is always unstable.

Activities and places, and the sociocultural climate indicators within, do influence perceptions and normality of climate. Unsurprisingly, changes in weather and climate

are often expressed in relation to corresponding activities and livelihoods. In rural areas, local farmers and villagers across different continents demonstrate the ability to recognise signs of changing climate with reference to local plant and animal, geography and culture. Basically, these make up their local weather knowledges (Lebel 2013; Pyhälä et al. 2016; Savo et al. 2016), for example, in terms of farm resource and livelihood stability (Holloway 1999; Forsyth & Evans 2013; Geoghegan & Leyshon 2012; Head et al. 2011), crop calendars and religious belief (Vedwan & Rhoades 2001), daily inlet of water into the fields (Barnes & Dove 2015), and development and deforestation (Jacka 2009; Rice et al. 2015).

In addition, local weather knowledge can be produced and passed on as cultural heritage through narratives in the form of family oral traditions (Cruikshank 2005; Sillitoe 2007), or everyday conversation (Harley 2003). This is when direct observation and knowledge becomes part of shared social memory and imagination, regardless of age, gender, social class and scientific knowledge (Bravo 2009). For these communities, changes in climate are known directly and indirectly through local-scale socio-environmental changes and the politics of environmental resources rather than through direct instrumental measurements of temperature and rain, or through scientific claims of global climate-change as part of education (Ingold & Kurtilla 2000). Nevertheless, other examples also show that, for pragmatic reason, a mix of personal observation, shaman's knowledge and scientific meteorology are used to forecast the weather, as do local farmers in Africa (Eguavoen 2013; Orlove et al. 2010; Roncoli et al. 2002).

Despite these place-based knowledges, penetration of technologies can also influence the way people normally perceive and experience the environment. Mundane technologies, such as air conditioning systems (Latour 2003; Hitchings 2010), water pumps (against flood) (Baron & Petersen 2015) or dams, weirs and canals for water supply (Barnes & Dove 2015), naturalise weather elements into routine life. They regulate and normalise the varying weather conditions before humans get to directly experience any (dampened) changes. In other words, these studies show that people become increasingly inert and detached from direct weather changes, and they become more reliant on signs observable from these technological objects. Local weather changes are then perceived and expressed in terms of technology's responses to such changes, for example, the regulations of room temperature, flood water level, or water supply into agriculture fields. At the same time, because of the high trust placed in technology's ability to deal with change, they may inhibit proactive responses against

potential disruptive weather (but as discussed above, proactive response could be driven by moral ways of knowing).

In addition, sociocultural and environmental narratives and development projects can mediate and influence people's way of knowing and perception to local weather changes. As Rice et al. (2015) in United States and Burnham et al. (2015) in China found, deforestation and conversion of forest to plantation, and not global climate-change, has become the explanation for local weather change. Local weather changes are understood within local cultural framings, development visions, and are dealt with locally, unlike some global climate-change discourses that require concerted global effort from people around the world. Thus, presenting abstract impacts of global climate-change makes little sense and does not always translate to positive actions (Barnes & Dove 2015; Baron & Petersen 2015).

I have shown that the weather cannot be separated from its places and cultures. Weather is known, imagined and practiced in relation to livelihoods and local surroundings. Examples have shown that it is often local people who believe that they themselves are both the cause of local weather changes, and are obliged to take responsibility, in order to regain or receive the weather that brings stability to their societies. As will be discussed further below, these local conceptualisations of local weather and climate are not well recognised in modernist climate-change adaptation interventions.

2.2 The Place for Farmers and Their Weather

In this section, my intention is to examine the intersection between two perspectives of the agrarian landscape and the weather: their embodied experiences, and the flows of their respective discourses and narratives. This focus from a non-modernist perspective follows on from my interest – outlined in Chapter 1 – in the lives of those in Thailand who are closely attached to the environment and the changing weather, be they hunters and gatherers, agriculturalists or peasants. Their lives in the fields and orchards are enwrapped in the weather, and the meanings of the weather are contextualised in those agrarian livelihoods.

First, I review concepts of place and space in Section 2.2.1, which provides a crude overview for understanding the multiple modes of place: dwelling and hybridity. These

key two perspectives are then tailored for examining the agrarian landscape (2.2.2), the weather-world (2.2.3), and climate-change hybridity (2.2.4).

2.2.1 Vertical and Horizontal Dimensions of Place

The multiple modes of place and space can be understood from the perspective of human geography. Agnew (1987) identifies three aspects of places: place as location, locale, and sense of place. First, place is thought of as a position on the Earth's surface that can be objectively measured. Second, place as the product and the producer of assemblages of materials and institutions, interactions and movements. Third, place as a site where feelings and meaning are attached through experience and communication. Place as a social construct, created through power relations could be seen as the fourth dimension (Cresswell 2004).

For philosopher of place Edward Casey, place is first and foremost 'the immediate ambiance of my lived body and its history, including the whole sedimented history of cultural and social influences and personal interests' (Casey 2001, p.404). By 'being-in-the-world' the inhabitant turns a physical space into a place that is homeland that informs simultaneous thoughts and routine actions (Heidegger 1962). To have emotion tied to 'home' then is to have a sense of place rooted to people and site (Tuan 1974). Through the repetition of routine practices, the perceptions and experiences of people become materialised in objects and place that then become the expressions of identities and meanings (Cresswell 2004). This is called 'performance', defined as 'material interaction, and identity formation and rearrangement that emerges through particular sets of relations with landscape' (Lorimer & Lund 2003, p.134). Performance then becomes a tool for negotiating and challenging one's identity, decision making process, and power status. The identity of place and sense of place then are multiple, contested and always in the making (Massey 2005). In this light, place is not only a real ground for existence of people and material, but it is also socially constructed.

While place is made from inside by dwelling in it, it is, at the same time, defined by outside networks of, say, politics, media and capitalism that are much larger than the boundary of the place itself (Cresswell 2004). Place, then, is relational and multiple (Massey 2005, p.9) as different groups make and re-make the same place using different storylines.

Smooth and Striated Space

The physical location and meanings of place are both the reason for, and product of, relational horizontal connections. In this case, Cresswell (2011) argues that place can be considered as an assemblage that ‘reflects the constant recombination of vertical roots and horizontal routes’ (Cresswell 2011, p.242). In ‘place-as-assemblage’ (Cresswell 2011), the materiality that makes up the topography and texture of a place always co-evolves and is co-constituted with the symbolic representations and narratives of the place. But at the same time, it is always undergoing constant push and pulls, where there are processes that make the assemblage of place more homogenous (rooted) and more heterogenous (routed) i.e. place of home, and space of flows, respectively.

This conceptualization of place is comparable to that of ‘smooth’ and ‘striated’ spaces offered in Deleuze and Guattari’s book *A Thousand Plateaus* (1987). A smooth space such as desert or the sea is inhabited by the nomads. Their knowledge, travelling and living are constantly formed through tactile experiences and dwelling. This space, characterized by fluidity, is filled with senses and series of spontaneous and heterogeneous events that make up the texture of landscape:

There is no line separating earth and sky; there is no intermediate distance, no perspective or contour; visibility is limited; and yet there is an extraordinarily fine topology that relies not on points or objects, but rather on haecceities, on sets of relations (winds, undulations of snow or sand, the song of the sand, the creaking of the ice, the tactile qualities of both).

Deleuze and Guattari (1987, p.421)

As argued by Deleuze and Guattari, the sea, for example, is becoming more ‘striated’ in the eyes of Westerners who gaze from a distance. The sea is being measured and organized into a system of connected grids as a result of the state’s navigation technology, rendering the space static and homogeneous. Subsequently, the sea is known through tools and equipment rather than sensual experiences.

Below, I provide theoretical accounts that advance the concept of smooth and striated spaces. I focus on the phenomenology of being-in-the-world, and the concepts of hybridity and assemblage offered by anthropology, human geography and STS scholars.

Echoing the non-modernist approach outlined above, as well as phenomenologists and philosophers like Heidegger, Deleuze and Guattari, Tuan, and Casey, I contend that humans are understood as always engaging with and being constituted by their

surrounding environment. This is the fundamental dimension of place – for human existence, perception and dwelling. In his book *The Perception of the Environment*, Ingold argues that the hunters and gatherers perceive nature by bodily and sensually engaging with it, not by constructing a view of, nor enculturing, nature (Ingold 2000). Nature for them has affective and intimate qualities, like parents; it unconditionally gives life (Ingold 2000). A place, which is filled with textures of surfaces, living and non-living things, affords to a dweller ‘sight, sound, smell that constitute its specific ambience’ (Ingold 2000, p.192). These are incorporated into mental and muscular consciousness, as well as into the landscape. A person then becomes a constituent of his/her own environment and vice versa. The relationship between the environment and its inhabitant in Ingold’s work is similar to the smooth space described in Deleuze and Guattari (1987)’s work.

As introduced above, the striated space can be examined through the concept of hybridity and assemblage. Recent trends in STS and relational geography are critical of the production and dissemination of scientific knowledge, its universal authority, and insensitivity to nature, for example: Michel Callon’s sociology of translation (1986); Bruno Latour’s non-modernity (1993) and Actor-Network theory (ANT); Sarah Whatmore’s hybrid geography (2002) and Nigel Thrift’s non-representational theory (1999). For this group of scholars, the world and its spatial relations is composed not only of relations between humans, plants, animals and landscape, but also of machines and objects, which are constantly defined and reconfigured from a distance and up close by multiple ontologies, knowledges and frameworks. In other words, the world is a hybrid; at once local and global, and natural, cultural and technical, and always more-than human (Whatmore 1999, p.33).

While Ingold’s phenomenology emphasises close engagement between dweller, environment and landscape, the concept of ANT and hybridity is more relevant in understanding the travelling of a particular form of knowledge and its constituents that progressively define, represent and shape social and natural worlds, while silencing others. As shown below, although the ‘world’ couldn’t exist alone without being penetrated by external forces, from Ingold’s perspective, it is this world which is first and foremost a condition for existence, growth and becoming.

Critiques of relational geography and STS’s hybrid approach to place and space concepts revolves around the issue of the prerequisite of the physical nature of life.

Referring to Latour's Actor-Network Theory and Whatmore's hybrid geography, Ingold (2011) contends that the world isn't an assemblage of networks of connected discrete objects because that would mean nature only becomes part of human culture, and is reconfigured once it is enrolled into a network. Instead, the heterogeneous objects should, he argues, be seen as different textures that blend into each other. In addition, while ANT's network carries agency of each actant, Ingold sees that it is the network itself (equivalent to 'line' in his term) that is a medium that allows for agency and action to emerge (Ingold 2011). The medium, in this case, can be the environment, water or air, which act as a ground for possibility of action, rather than just an object to be interacted with. Echoing Ingold, landscape phenomenologists Rose and Wylie (2006) criticise the network's 'flat' ontology and their '*topological* spatial imagination' (Whatmore 1999, p.30 original emphasis), for underemphasising the importance of *topographical* texture (but see also Blok (2010)'s critique of 'vertical' network). For them, it is the uniqueness of texture and materiality of landscape that animates human feelings and perceptions (Rose & Wylie 2006, p.487), and allows the place to be imagined, conquered or given authority. As Thrift (Thrift 1999, pp.314–315) argues, ANT fails to capture the importance of place, and the embodiment of tactility, emotion, memory and performativity into place.

Another related issue of Actor-Network theory is its non-hierarchical network that treats human and non-human entities to have equal power (Bosco 2015). In her concept of 'sociotechnical imaginaries', Jasanoff (2015, pp.17–18) argues that ANT fails to capture the reality that, for example, science travels from a centre and reworks a society at a periphery because of unequal and dominance of power relations, politics and morality. Recognising internal differences of power better explains why a decision was disregarded, or adopted and sustained in the first place (Jasanoff 2015).

Concepts of smooth and striated spaces, place-as-assemblage, and phenomenology of being in a landscape and hybridity, are discussed in more detail below in the context of agrarian landscapes, the weather and climate-change. As introduced at the beginning of this chapter, I adopt a 'mixed ontology' between realism and social constructionism. I agree with Rose and Wylie (2006) that the texture and materiality of the landscapes, especially the agrarian landscape and its changes in the weather and seasons, are what make the inhabitants alive. This point is fundamental to this thesis, especially in Chapters 5, 6 and 7. Yet I also recognise the importance of assemblages and flows of discourses and narratives, as documented in Chapters 6 and 8.

2.2.2 Dwelling in the Plant-world

For farmers and peasants, their livelihoods are contextualised in relation to a landscape dominated by plants (and domestic animals) such as crops, fruits, farms, agricultural fields and garden. In addition, their lives are also entwined in the ever-changing flows of the weather. The latter is discussed in the next subsection.

In recent trends in human geography that aim to reanimate the materials of landscape and landscape itself (Whatmore 2006, p.33), new research themes on plant-human relationships are emerging but only slowly and so remain understudied (Cloeke & Jones 2001; Hitchings & Jones 2004)¹. Ginn (2010, p.18) also noted that most literature reduces plants (in his case, garden plants) to mere objects, ignoring their materiality and ability to affect humans. As Head and Atchison (2008) argue, plants exist in multiple forms: as a physical presence, as part of global production and consumption chain, and part of national identity.

Below, I first outline the emotional and experiential dimensions of being in the plant-world. I also acknowledge the ecological, social and political aspects that frame these interactions, hence the second part examines plants as part of a global economy and the flow of knowledge.

The Plant-human Relations

In this section, I draw on examples to illustrate the plant-human relationships. The term ‘plant’ here include small garden plants, crops in a field, forests in a rural area and fruit orchards. I first start with the experiences and relationships of being in a garden and dwelling in a fruit orchard.

In a study of British home gardeners, Stenner et al. (2012) show that a garden is more than a mere physical space. By being in the garden, four modes of experience were exchanged between the plants and the gardeners. In the ‘naturalistic mode’, being in the garden and sensing their surroundings makes one feels at ‘home’. The garden is a source for spiritual well-being. In the ‘pragmatic mode’, the garden becomes a space for sensuous interactions and active engagement between body, plants and soil through practical tasks (digging, fertilizing etc.). In the ‘nostalgic mode’, the garden acts as a memorial that (re)connects relationships and experiences from the lost past with the present. Lastly, in the ‘discursive mode’, the garden – a classed, gendered, cultured and historicized space – creates a sense of possession where imaginary territory and power relations are constructed (Stenner et al. 2012).

Similarly, Crouch (2003) finds allotment gardens in Durham to be plant-places that are modes and mediums of expression, which are inherently multiple. They are at once a physical presence for interaction, a source of spiritual well-being and memory, expression of identity, and a physical and symbolic territory. It is important to note that these plant landscapes are not purely 'natural' as they are constituted by human feelings and values.

Plant-world of Relations and Flows

There is more to a plant landscape than being a place for perceptions and experiences. Hinchliffe's work illustrates the complexity of a public garden in Birmingham where three related practices all contribute to making multiple realities of the same garden (Hinchliffe 2010). The women's vegetable garden is shaped by immediate plant-soil-earthworm-weather-human relations that they come to gather weekly. The City's urban green space is shaped by elites' long-term vision of the city that emerges from discussions in offices. Lastly, the NGO's charity garden is evaluated by sets of quantitative monitoring targets dictated by monthly deadlines. These are activities where different goals, temporal and spatial aspects shape the same garden in different ways.

Stenner et al.'s and Hinchliffe's gardens show that a place is networked into a hybrid relation of people, organic entities, technologies and knowledges, and these relations constitute the place itself. These ideas are also illustrated clearly in Cloke and Jones (2001)'s Somerset apple orchard, which is composed of immediate relations and globalised flows. On the apple consumption side, tourists walk through the orchard, looking, smelling and handpicking the apples. While being in this particular landscape, thoughts about the orchard in different seasons may come to mind, or the apple's freshness, pesticides, supermarkets, Somerset landscapes, EU farming and so on (Cloke & Jones 2001, p.663). It is the being and thinking in a landscape that makes the dwelling an 'embodied and an imaginative embeddedness in landscape... [that create]...complex sensory and imaginative, dynamic, collages of being-in-this-place' (Cloke & Jones 2001, p.663). The apple orchard comes into being as it is wandered through by the tourists.

On the apple production side, orchard workers put in much care and love into pruning, thinning and picking apples, where each individual tree is nurtured manually. External scientific knowledge about cultivation techniques is improvised and performed locally and uniquely for each tree. It is this affection for nature that turns a strict code of

knowledge and practice into a lively embodied experience, binding and harmonising culture and nature. For the workers, each tree then is an individual taskscape developed over time (Clope & Jones 2001, p.662). In sum, the same orchard is a multiple place: a physical site in Somerset where trees are grown; a relational site where human and non-human things bind together harmoniously; a symbolic place that preserves the identity of the traditional English apple orchard and landscape; a place of networks of production-consumption chains, labour and technology. The *orchardness*, or the totality of the orchard, then, is produced and maintained from within its own space and flows into and out of space (Clope & Jones 2001, p.662).

By thinking in terms of relationships and flows, plants in a garden or an orchard are irreducible to a single kind of entity. These plants and their places do not exist beforehand, waiting to be acted upon, and nor do the flows and activities; they are woven together and related to each other. But no single one is more important than another (Hinchliffe 2010). They are always constantly made and re-made by those of different goals and related practices, resulting in a multiple world. Nevertheless, following Ingold, these flows require the very physical materiality and embodied interaction first and foremost.

2.2.3 Dwelling in the Weather-world

Based on the same argument used above to deconstruct the binary opposition and anthropocentric view of nature and plants, here I apply these ideas to the mundane weather, which encapsulates people and their agrarian landscape. Following on from *The Perception of the Environment* (Section 2.2.1), Ingold developed a concept called the ‘weather-world’, which sees humans and the weather as inseparable and always coevolving. I also present other concepts which further support and enrich the weather-world concept, namely, ‘weather-place’ (weather, place, movements), ‘weather-ways’ (weather in daily life) and ‘seasonality’ (weather and time). These concepts exclusively highlight the importance of the qualitative dimensions of air, weather and seasons that are largely ignored in studies of the human dimensions of climate-change.

The Weather-world

Just like in the plant-world, the air, weather and landscapes are also considered a medium for perception, learning, being and living. Ingold’s approach to the weather is an attempt to reverse the established modernist ontology that locks us into seeing nature as pre-existing objects external to human culture, and instead argues that there

is no divisible subject/object, substance/medium, real/imagined. In other words, there is also no separate boundary, surface, nor layer between the atmosphere and earth. Rather, this open world, or the weather-world (Ingold 2005; 2007; 2010), suggests that humans, land and weather are always connected and not closed off from one another. It is in the 'vaguely defined zone of admixture and intermingling' (Ingold 2007, p.S33) of the earth and the sky where life is lived. In this zone of entanglement, humans are at once a body-on-the-ground and at the same time a body-in-the-air (Ingold 2010, p.S122). Humans, plants and animals are immersed in the fluxes of weather while moving in the open landscape (see Figure 2.1). The medium is fundamental to life as it allows for respiration, movement and growth.

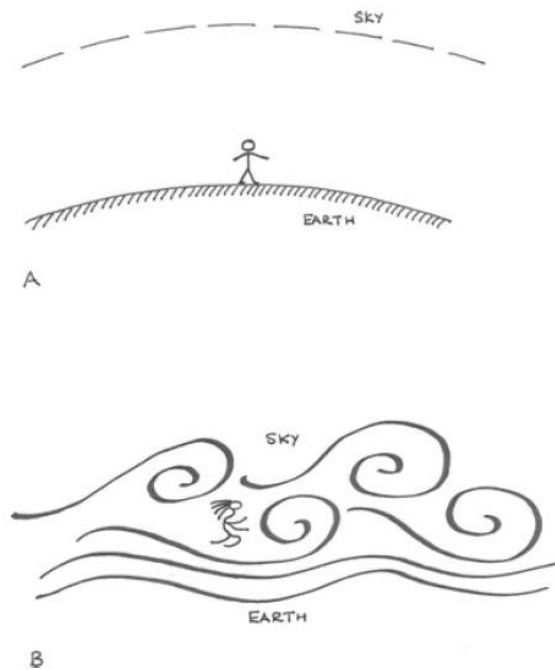


Figure 2. 1 The 'exhabitant' of the earth (A) and the 'inhabitant' of the weather-world (B) The weather, the earth and humans, as the 'inhabitant' of the weather-world, are in constant flux, and they are always mixing. This is unlike the 'exhabitant' of the earth where the land is clearly closed off from the sky and humans (Diagram taken from Ingold (2007), Figure 4).

The weather is a medium of perception. We come to know it, as we experience it, because our experiences afford us an understanding of its movements, growth and formations (Ingold 2007, p. S28). Because of its immediacy, that we are immersed in its fluxes, we perceive things in weather (Ingold 2005, p.102 original emphasis). Ingold states that we don't see sunlight but we see in sunlight because sunlight is a medium for

seeing. What we see in light are variations in colours and shades that reveal to us the texture of objects, where the light falls onto the surface and reflects into our eyes (Ingold 2010, p.S132). Similarly, we don't touch the wind but we touch and feel in the movement of air, and we don't hear the rain but hear in the rain which falls onto materials to reveal their textures. It is important to note that the perception of atmospheric conditions is always invested with emotions, memories and meanings:

Inhabitants, I contend, make their way through a world-in-formation rather than across its preformed surface. As they do so, and depending on the circumstances, they may experience wind and rain, sunshine and mist, frost and snow, and a host of other conditions, all of which fundamentally affect their moods and motivations, their movements, and their possibilities of subsistence, even as they sculpt and erode the plethora of surfaces upon which inhabitants tread.

(Ingold 2008, p.1802)

What is important is that as the weather changes, it affects the ways we perceive things. The '...ever changing [weather's] moods, currents, qualities of light and shade, and colours, alternately damp or dry, warm or cold, and so on...' (Ingold 2005, p.103) result in variations in visual, audio and haptic experiences, implying that we perceive the same thing differently each day (Ingold 2005, p.101). A clear example is the sea, where the colour and texture of its surface reflect the weather conditions. To see, hear or feel is to experience, and to experience is to enter into the mode of being. Therefore, 'to see the sky is to be the sky, since the sky is luminosity and the visual perception of the sky is an experience of light' (Ingold 2005, p.101). After all, as we perceive things in the weather-world, we are becoming part of it, and the world is becoming part of us. For Ingold, inhabiting the weather-world is 'to dwell within a weather-world in which every being is destined to combine wind, rain, sunshine, and earth in the continuation of its own existence' (Ingold 2007, p.S20). And because the experience of the weather influences our moods in particular ways, the weather then is 'the very temperament of our being' (Ingold 2010, p.S122).

Thus, the weather-world describes continual human learning and becoming that is constituted in the fluxes of land and sky. And because the flux of weather is always changing, it affects the emotions of its inhabitants, and the ways the world is perceived. As Pillatt puts, 'both ground on which one stands, and weather in which one stands' (Pillatt 2012, p.34) allows for the insiders to move through, and act with purposes.

Rhythms, Movements and Adjustments

Ingold's concept of the weather-world has been endorsed and developed further by a number of scholars. Vannini et al. (2012) add ideas of human mobility and place-making to suggest that we make sense of weather as we move along with its rhythms and flows. People always need to familiarise themselves physically and emotionally with a new place and its local weather in order to make the 'weather-place' home (Vannini et al. 2012). Similarly for de Vet (2014), people adjust their routine, mundane activities like clothes drying, gardening and house designs, according to weather sensations, its flows and impacts on material objects. In this way of living, the 'weather-ways' (de Vet 2014), such adjustments reveal just how much the weather is imbued into life at a micro-scale level. What emerge from examining movements and adjustments are awareness, sensations, emotions and memories that go into binding weather to human life.

When the weather is humanised, it is no longer thought of as a spell of atmospheric conditions pre-defined into a distinct repetitive period (e.g. winter and summer, etc.) which society faces. Based on the idea of medium and process, certain weather conditions and a particular set of human activities are what co-constitutes and defines a particular moment of the 'seasonality' (Krause 2013). For Krause and Country et al. (2016), to think of winter, for example, then, is not to think about the time of year, but to think about histories, memories, emotions, and human and natural things that make up winter, and which together make it memorable as winter. As noted in Ingold's ideas above, movements of the weather make us perceive and experience the same environment differently each day, and the seasonal rhythm of the weather then reveals the variations in life, behaviours and characteristics of the same environment over time, as it is constituted by diverse sets of relations.

Life goes on, and continually adjusts, in rhythms of seasonality. While looking forward to the next season, one still lingers in memories of the previous one. There are always expectations and anticipations for signs that lead to the 'right' time in the seasonal rhythm (Ingold & Kurtilla 2000, p.190; Krause 2013, p.41). When the right time emerges, awareness and memories resurface and inform the activities and decision makings based on memories. When weather performs unexpectedly, its disruptive effects reveal how important it is, physically, culturally, and psychologically, to the social lives of people. Shown in studies of Head et al. (2011) in New South Wales, Australia, and in Geoghegan and Leyshon (2012) in Cornwall, UK, unexpected weather events cause stress, anxiety, headaches and sleeplessness to farmers. The disrupted daily

routines due to adverse weather also damaged their identities, since they failed to produce crops that represent their livelihoods and knowledges. Memories and identities, therefore, provide cultural resources for practices and activities to be improvised in the future as climates may change.

Identity as a cultural resource is invoked through place-making, adjustments and acclimatisation, which in turn leave intense marks on an 'ensemble of memories tied to experiences that have unfolded within a place' (Vannini et al. 2012, p.373). In other words, weather constitutes multiple modes of being and reveal people's 'senses of personal, religious and community identity and their attitudes towards the natural environment' (Pillatt 2012, p.577). 'Weather-ways', 'weather-place', and seasonality are task-oriented (Country et al. 2016; Krause 2013; Ingold 2010). As humans move in and with the weather, lines of life are entangled, untangled and re-entangled to constitute the weather-world itself (Ingold 2011; Massey 2003; Vannini et al. 2012). As shown in the next section, however, the weather-world is read very differently by those who see themselves as 'exhabitant' of the world.

2.2.4 Hybrid Climate-change

De-culturing of Climate

In addition to the multiple ways in which weather-worlds are lived, the fluid weather space could also be understood by looking at the roles of knowledge and technology. Through meteorology, and widespread use of standardised weather instruments, local weather elements are captured and turned into meteorological data. Statistics and computer models are used to reveal past, present and future changes of climate. In turn, global knowledge institutions like UNFCCC and the IPCC redefine local people's understanding, imaginations, moralities and apprehension of responsibility for changes in the weather (Hulme 2008).

For scientific practices alone to imagine, represent, enumerate or map the weather, is to deny the space-time dimensions that allow for the emergence of relational and multiple human and non-human stories that constitute dynamic weather space (Massey 2003). Through 'desensitization' (Latour 2003, p.106), weather is rendered passive, ready to be manipulated and becomes technical, public, and a political entity across scales (Hulme 2008; Jasanoff 2010). Separating and re-combining discrete blocks of weather with culture is totally different from continuously weaving the journeys of weather through culture (Ingold & Kurtilla 2000). In other words, the smooth weather

space is de-cultured (Hulme 2008) and slowly evolves to a striated space. In effect, the smooth space of lay people is deterritorialised and then re-territorialised by, and in favour of, scientific ontology and institutions, which have greater social authority. Just like the plants and their places, climate-change is not a purely natural phenomenon. It is invested with hidden meanings, narratives and politics that are vested in networks that transcend the boundaries of nature and culture, local and global, lay and experts and so on (Head & Gibson 2012).

Travelling Ideas and Interpretations of Climate-change at Local Sites

According to Jasanoff (2010), climate-change, a product of a modernist approach to environmental governance, breaks four social practices of knowledge co-production, namely, experience, responsibility, boundary and time. First, as it is argued above, climate-change becomes impersonal to human experience. Second, the institutional body and expertise of the IPCC operate beyond the national level, which blurs the role of national governments and their citizens in co-producing climate knowledge and policy. Third, climate-change becomes a transboundary problem, creating an unclear sense of ownership and responsibility. Finally, the futuristic timeframe is difficult for laypersons to perceive and experience. The implications of this, argue various scholars, are that current ways of producing and framing climate knowledge require critical examination.

The production, travelling and consumption of climate knowledge requires thinking in terms of authority, scale, space and boundaries. For example, Hulme (2008, p.9) asks ‘...how are the contours of this knowledge shaped? How localised are the sites of climate-change knowledge production and how well does this knowledge travel?’ Similarly, Rudiak-Gould (2012, p.9) raises the question of how a global climate knowledge discourse is ‘received, interpreted, understood, adopted, rejected and utilized’ into local cosmos and understanding of nature. As shown below, the universally claimed authority of IPCC’s climate science has been differently received and interpreted in different political and cultural settings (Jasanoff 2010; Miller 2004a). In this case, I focus on the role of climate organisations and their projects which help put the scientific idea of climate-change into global circulation.

Some scholars go further, pointing out the dangers when politics interferes with the dissemination of scientific knowledge (Sillitoe 2007) and climate projects (Orlove 2009). The ‘pedagogic role’ of powerful institutions (Bravo 2009) dictates how climate-change

is defined and understood at local levels, and how local communities should respond. Although climate adaptation projects may have extracted the idea of vulnerability from statistics and models, and correctly identified physical and technical solutions to climatic hazards, it is often the case that local weather knowledges or beliefs are seen as passive, silenced or ignored when confronted with scientific claims (Adger et al. 2012). These include the role of traditional knowledge, religious and spiritual beliefs aforementioned in Section 2.1.

In addition, examples have shown that there are mismatches when the Western idea of climate adaptation is used and interpreted at local sites. By using Callon (1986)'s sociology of translation, Weisser et al. (2013) show that disciplining and enrolling East African communities into particular framings of climate adaptation was met with resistance. These included different views of local visions of development, political systems, and degree of interference by external organisations. Similarly, Leyshon and Geoghegan (2012) show that the answers to whether it was necessary to adapt to future climate impacts on rural biodiversity of Cornwall and whether there was the right adaptation management, depended on the different visions, priorities and narratives of the nature conservationists and local farmers. The conservationists identified cattle grazing as key to biodiversity loss, made worse by changes in climate, and so constructed a series of cattle grids around the countryside to prevent grazing. From the local farmers' perspective, the cattle grid didn't improve existing local problems, and didn't communicate anything related to climate-change. It shows that the cattle grid, as an 'anticipatory object' brought climate-change to local people as an external, partial, unforeseeable and unnecessary idea (Geoghegan & Leyshon 2012, p.243).

The issue of language and communication of weather and climate is also a growing area of study (Nerlich et al. 2010). Recalling the Marshallese case in Rudiak-Gould (2012) (Section 2.2.2), the government intentionally used scientific findings and catastrophe narratives to describe how the islands were extremely vulnerable to rises in sea level, and portrayed people as lacking the ability to respond. This was to attract international donors and to claim that changes in climate were observable. But from local people's perspective, the internationally recognised term of 'climate-change' didn't make sense, and needed translating to make it linguistically and culturally relevant. Losing the accuracy of the scientific term, 'climate-change' matched best with '*oktak majetoto*' or cosmological change in Marshallese language (Rudiak-Gould 2012). It explains any socioenvironmental degradation as caused not by greenhouse gases but by people's

moral corruption. Fortuitously, the term has been successful, and has positively encouraged climate mitigation and adaptation (Rudiak-Gould 2012). The author concludes that the local understanding of weather is valid in its own right, and should be appreciated by the scientific community.

These examples lead to questioning the scientific hegemony of global discourse on climate-change when traveling from Western to non-Western societies (Hulme 2011b). Clark Miller (2004b) calls a powerful global institution such as the IPCC, that presents itself as sole governor of an issue (usually global, like changes in climate), the 'Empire'. Through constant construction of its values, standardization and ordering of knowledge, the Empire enrolls its clients, near or far, into its network, and into a particular framing of the issue. But as noted above, global knowledge can be differently interpreted or can be resisted. This is because, according to Jasanoff (2015), there exists diverse 'sociotechnical imaginaries', or 'collectively held and performed visions of desirable futures', even within a single nation. Therefore, for a discourse or knowledge to be successfully deployed locally, local values need to be understood and constant negotiation with local actors and objects is required (Livingstone 2010). In other words, local places, cultures, knowledges and values should have their place in the current global climate-change discourse.

Bravo (2009) and Strauss (2012) point out that whether a society is adaptable to change or not, and whether it is at risk of losing its culture, must be determined from voices within that society, not from an external institution. Adger et al. (2012) address this implication of unequal power relations received at local sites through three questions: whose values counts? who has a voice? and what information is legitimate? Adaptation projects that respect local beliefs and cultural contexts could help to achieve adaptation goals, avoid maladaptation, as well as protect physical and cultural elements (Adger et al. 2012; Bravo 2009; Fresque-Baxter & Armitage 2012; Strauss 2012).

In this section I have contrasted ontologies and epistemologies of weather, climate and its changes and climate-change, seen from modernist and non-modernist perspectives. In this regard, Siltoe (2007) asks whether global science be culturally relative and subjective. Savo et al. (2016) see opportunities for integrating local observations with scientific forecasts and models to enhance place-based climate studies. This may be overly optimistic. What is certain is that global science needs to be open to all possible systems of knowledge and other means of acquiring knowledge. Or at the very least, as

Donner (2007), Hulme (2010a) and Klenk and Meehan (2015) suggest, with less optimism about knowledge integration, each cultural group should be allowed to interpret changes in weather and climate according to their own understanding, rather than being coerced into a universal scientific understanding. As Klenk and Meehan have argued, IPCC's goal of a consensus on knowledge integration is a messy, exclusionary practice that 'masks the ontological politics of scientific knowledge, including the friction, antagonism, and power inherent in knowledge co-production' (Klenk & Meehan 2015, p.165). For the pessimists, to integrate is to deny differences in ontology, as introduced in Section 2.1.

2.3 Summary and Research Questions

As discussed above, my approach to the problem of nature and culture is a blend of realism and social constructionism, aiming at critiquing established binary oppositions and moving towards a view of nature and culture as relational, dynamic and multiple. As argued in Section 2.1, nature and culture constitute each other. From the phenomenological perspective, nature is always entangled in human culture, and I particularly emphasise the existence and importance of physical nature and the unique topographies and landscapes that become resources for human experience, practices, affect, imaginations, culture and history at different spatial scales. I am also aware of the importance of STS and relational geography in understanding the relationship between knowledge and environmental governance. With Jasanoff's comment in mind, I also pay attention to hegemonic power, the knowledges, ontologies and politics that circulate and penetrate local sites, and constantly configure and reconfigure the hybrid socionature and its humans, non-humans and objects constituents. In short, following on from Latour (1993)'s critique of the modernist purification of these binaries, this approach aims to deconstruct the established nature/culture, global/local, modern/traditional dualisms.

The same approach is applicable to plants, weather and climate-change, which are the focus of this thesis. In Section 2.2, I showed that both the plant-world and the weather-world are places for dwelling and experiencing, as well as places that are subjected to flows of external socioeconomic discourses and power. The relational perspective suggests that plants and weather, and their places, are reciprocally a medium for, and emerge from, human experiences, perceptions, emotions and knowledges that are invested in living an open world. The flow and network perspective sees plants and

weather, and their places, mediated and manipulated across spatial scales by knowledges and technologies of various groups that have different visions, narratives and priorities. They are multiple entities that are more alive than ever.

Using this fluid ontology, and following the cultural turn in human geography, there is a need to move away from thinking of plants and weather, and their places as objects and spaces 'out there'. Rather we need to move toward fluid, encultured and familiar places for practice and performance. This is to see plants and weather as more-than-representational (Lorimer 2006), and to re-animate subjectivities (Whatmore 2006) that were missing somewhere between the atmosphere and the landscape (Ingold 2007). The weather-centred perspective (Pillatt 2012) recognises the affective temperaments of weather (Ingold 2010) and its reciprocal relationship with humans (Hulme 2015a). The same goes for plants. This approach avoids overemphasizing human agency and power, revisiting the social dimensions of 'nature', and asks how they affect human society; what kinds of things come together to make up a weather-world; and what effects emerge as a result of this coming together (Whatmore 2006).

Climate-change is different from the plants and the weather. Within the notion of climate-change, weather is understood through scientific ontology and epistemology, is then stripped from its local culture and places, to become an idea that can travel across scales (Hulme 2008). But just as with plants and the weather, climate-change is also a socionatural assemblage, composed of things that are more than the physical climate itself. The production, circulation, communication and interpretation of climate knowledge has been a growing research direction among anthropologists, geographers and STS scholars. My non-modernist approach in bridging farmers, plants, weather and climate-change is a contribution to the current growing studies from social sciences and humanities as raised by Hulme (2011a).

Within and between agriculture, weather and climate-change studies there are also research gaps, and this thesis addresses such gaps and contributes to enhancing the potential of this research direction. Over the past 15 years, ethnographic research in developing countries, especially in agricultural or subsistence communities, has begun to put emphasis on personal experiences, emotions and the cultural dimensions of weather and climate-change as their central arguments. This has been documented in edited volumes of, for example, Strauss and Orlove (2003), Crate and Nuttall (2009) and Barnes and Dove (2015). Studies of Head et al. (2011) and Geoghegan and Leyshon

(2012) epitomise studies that bring weather and climate-change studies into the context of rural agrarian livelihoods.

Although there are studies from Southeast Asia in terms of climate impacts on agriculture and subsistence communities, they are very limited in terms of contributions from anthropology and humanities that seek to bring experiential, emotional, moral, knowledge making and governance aspects to the fore (see Chapter 3 for detail). As mentioned above, a growing number of studies see spirits and deities as explanations of adverse changes in climate (Cruikshank 2005; Byg & Salick 2009; Paerregaard 2013). But reports from Southeast Asia, and more specifically, from within a Buddhist worldview, are limited, with exception of the work of Susan Darlington (2014). Importantly, studies like those in Holloway (1999) and Rudiak-Gould (2012) that examine the intersection, mobilisation and circulation and interpretations of different kinds of weather and climate knowledge in agriculture or subsistence, are severely lacking in a Southeast Asian context.

Based on these literatures and the gaps identified, I propose the following research questions for this thesis, applied to Northern Thailand:

Box 2. 2 Research Questions

1. How do bodily, material and farming practices create, express and challenge farmer identity and place-making?
2. How do farmers observe, experience and remember weather changes, and how do they interpret and construct meanings of weather in relation to their everyday farming practices and places?
3. How are climate-change discourses circulated to agricultural communities, and how do they correspond to or hinder farming knowledge, identity and practices?

Answering the first research question involves a general overview of how humans and nonhumans constitute place and identity through livelihood practices. Answering the second question uses the phenomenological approach of place, and especially Ingold's concept of the weather-world, to understand how being in a place allows one to experience the subtle change of weather in one's everyday life. To answer the third question, I examine the production, circulation and interpretation of global climate-change knowledge, and compare this to what people know experientially (from Research Question 2). The literatures reviewed in Sections 2.2.1, 2.2.2 and Research Question 1 will form the basis of Chapter 6 on place and identity-making. Chapter 7 on weather knowledge in place is built from Section 2.1 and 2.2.3 and Research Question 2, while Chapter 8 on the circulation of knowledge and discourses is based on Research Question 3 and literature from Section 2.2.4.

Using place and space concepts as the central theme, a situated site, for example, an agricultural village, can be considered a fluid space that can accommodate an investigation into the three research questions. It is where the world of plants and weather mingle, and where the flows of climate-change discourse penetrate. It is irreducible: at once natural and cultural, material and symbolic, lived and manipulated, local and global, and personal, public and political. Such a village is always under-construction, shaped by different epistemic communities that continuously make and remake weather stories (Blok 2010; Head & Gibson 2012; Hulme 2008; Jasanoff 2010). Following the issues of ontology and epistemology introduced earlier, it is important to point out that my methodology and methods, as shown in Chapters 4 and 5, are also fluid. Based on phenomenology and ethnography, my purpose is to listen to people telling weather stories in order to capture the multiple meanings of weather and climate in the situated cultural context. In the next Chapter I show how these research questions apply in the context of northern Thailand.

Chapter 3: The plurality of Climate in Thailand

Having identified a research gap and outlined the research questions, in this chapter I intend to place these questions in the context of Thailand and more specifically, in Nan. The purpose of this chapter is to illustrate what climate means for Thailand and for different groups of people, in terms of environmental governance, academic research, cultural belief and geographical imaginations. It draws on different ontologies and framings of nature, ranging from: decision makers who attempt to manage and fix climate; scientists who predict future climate impacts; villagers who live in the weather and seasons; foreign travellers who experience the heat as intolerably hostile, both physically and mentally; and organisation practitioners who bring in external discourses of climate into local communities. These cover the development and multiplicity of ideas of climate in Thailand seen through different groups, at different spatial and temporal scales.

In Section 3.1, I review the emergence of climate policy at regional and national level in parallel with climate adaptation research in Thailand's agricultural sector. I show that there are a number of studies emerging from the social sciences and humanities that my work can expand further. At the beginning of Section 3.2, I explain that I chose Nan province in northern Thailand for my research site to give importance to, and expand the underrepresented roles of cultures and livelihoods within existing research. Following that, I introduce Nan's cultural belief system, especially, its culture-nature ontology, its representations from outsiders, and the existing socioeconomic and environmental problems. I finish with Section 3.3 on the rise of environmental movements in Nan, as well as key organisations that aim to tackle existing development problems as well as climate-change issues.

3.1 Climate-change from the Perspective of Southeast Asia and Thailand

3.1.1 Climate Governance in Southeast Asia and Thailand

The region of Southeast Asia is currently facing a developmental question (ADB 2011). On the one hand, its rapid development relies on multinational corporations' exports of natural resource extraction. On the other hand, there is a need to improve basic living standards, food security and energy supply while maintaining sustainability. Meeting development agendas remains a challenge for this region as three quarters of the entire population of 625 million are small-scale farmers, and are highly dependent on welfare and quality of natural resources that are becoming increasingly threatened by impacts of changes in weather and climate (ADB 2011). With these challenges and opportunities, the Association of Southeast Asian Nations (ASEAN) has addressed climate issues through its strategies and actions in the agricultural and energy sectors (Letchumanan 2010).

In 2010, Thailand's Office of Natural Resources and Environmental Policy and Planning (ONEP) responded to the climate challenge by establishing the Thailand Climate Change Master Plan (2012-2050), to 'enhance resilient and sustainable development and reconstruct economic development toward a low carbon society' (ONEP 2012 p.1). The long-term goal is to 'solve the issue of climate change' through, first, building low-carbon infrastructure, promoting behavioural change and increasing carbon sink through mitigation, and second, to build capacity and strengthen resilience to changes in climate through adaptation (ONEP 2012).

In parallel, an assessment of the state of climate knowledge at country level by an IPCC-like platform called Thailand Assessment Report on Climate change (TARC) shows there is a growing literature across the three 'Working Groups' (Limsakul et al. 2011; Snidvongs & Chidthaisong 2011), although adaptation studies are relatively weak compared to the rest (MRC 2009). In terms of collaboration, Thailand hosts a number of international climate-related organisations, for example Thai-German intergovernmental cooperation (GIZ), the US funded Mekong Adaptation and Resilience to Climate Change (ARCC) program, Stockholm Environment Institute, Greenpeace and Oxfam. Given these prospects, however, the national climate plan

seems to favour the interests of government officials and the private sector while ignoring public participation (Lebel et al. 2011). Furthermore, climate policy has not been mainstreamed to address existing underlying problems of conflicting natural resource management policies that have resulted in poverty and inequality for the most vulnerable groups, especially small-scale farmers (Lebel et al. 2011).

Both at ASEAN level and in Thailand, climate policy directions prioritise climate mitigation over adaptation, where the latter largely remains at the level of rhetoric (Eucker 2014, p.278), lacks clarity in terms of planning, and mostly focuses on communicating adaptation information (MRC 2009). Indeed, Lebel et al. (2009) argue that Thailand's Climate Master Plan lacks any real substance for practically combating future climate impacts. The question is, if the Plan aims to solve the problem of climate-change, who has the expertise? Lebel et al. believe the Plan has been drawn up without giving enough space for knowledge participation from all kinds of stakeholders, especially marginalised voices. Moreover, Eucker (2014) believes that future concrete adaptation strategies are at risk of failing if ASEAN's institutional framework does not seriously mainstream sustainability linkages into economic development and climate policies.

3.1.2 Climate Adaptation Studies in Agricultural Sector

One of the first two most comprehensive climate adaptation studies in Thailand and Southeast Asia was an impact and vulnerability assessment of rain-fed rice of the Kula Ronghai region in north-eastern Thailand, conducted by Kerdsuk et al. (2005) and subsequently by Chinvarno et al. (2006). Both studies, in collaboration with various international institutions, used an integrated downscaling climate model for mapping vulnerable areas, as well as household surveys and interviews to derive indices of vulnerability, farm production dependency and adaptation options. A similar study was up-scaled to the Lower Mekong Basin levels to assess climate impacts on rice, cassava, corn and sugar cane, and their potential growth under differing future socioeconomic and crop scenarios (Kerdsuk et al. 2011).

Due to national food security and economic reasons, most climate-rice studies were located in north-eastern and central Thailand, the main growing area. Only a limited number of studies (not peer reviewed) are from the north, e.g. by Boonrahong and Unjanum (2011). They show that due to a combination of climatic, economic and political factors, farmers in different sub-districts changed their farming system from

cash crop intensive to cash crop and/or subsistence organic farming to maintain ecological sustainability and be less dependent on market forces while maintaining some profits.

Early climate-change studies on the agriculture sector in Thailand fall into the category of what Chinvanho and Kerdsuk (2012) call ‘predict-then-adapt’ and scenario-based/sequential approaches, and as a result of Thai policy planners being influenced by the structure of IPCC Working Groups, overlook cultural, social and economic dynamics from current development plans. The authors call for an emphasis on context and place-based studies where climate is seen as internal to a community.

3.1.3 The Human Dimensions of Climate Adaptation: The Thai Context

An emphasis on social science and multidisciplinary-based approaches in Thai climate adaptation studies is exemplified by Chinvanho (2013). His ‘holistic approach’ to climate vulnerability and adaptation assessment is based on an understanding of relationships within and between sectors and livelihood communities, and their multidirectional responses to climatic, ecological, social and economic pressures, where these sectors and pressures are situated within a landscape (Chinvanho 2013, pp.3–4). This place-based approach to adaptation partly echoes that of Adger et al. (2012). The difference, however, is that the word ‘landscape’ in Chinvanho (2013, p.15) is used merely as a unit of assessment, defined as a geographical or political are, whereas Adger et al. (2012) additionally emphasise the intrinsic and experiential values of natural resources and their cultural meanings to inhabitants within a landscape.

Only a few studies have started to include farmer’s narratives and touch on perception, affective, traditional knowledge, cultural beliefs or historical elements. For example, in their work on farmers’ adaptation in the north-east, Kerdsuk and his team (2012) found that farmers’ decision to switch from traditional single wet season cropping (Jasmine rice) to irrigated multiple cropping (non-Jasmine rice) had secured financial issues against low productivity due to extreme annual drought and flood. A new problem, however, was that the non-Jasmine rice varieties were not in market demand, and often resulted in crossbreeding, which lowered the quality of Jasmine rice. Kerdsuk et al. (2012) showed how this switch of rice species eroded the identities of traditional Jasmine rice farmers and of Kula Ronghai landscape, the most suitable place for

growing Jasmine rice. This is an example of what Adger et al. (2012) call maladaptation due to the neglect of cultural factors.

In a study of Kansantisukmongkol et al. (2012), the problem of climate for highly resilient fishermen communities in southern Thailand is something that they ‘need to cope with, but not to the level which is needed to be solved’ (2012, Chapter 8 pp.4–5). The fishermen in this study could cope with current climate variability at a household level but the cause was unknown to them, while abrupt and extreme climatic events were beyond their comprehension based on traditional knowledge (Kansantisukmongkol et al. 2012). With non-climatic problems on the other hand, they expected to solve confidently themselves, or expected local authority and/or external organizations to do so. Such themes of conflicting knowledges, blame and responsibility are very much missing in the Thai climate research arena.

Recently, a study from an environmental psychology perspective emerged to help fill this gap. Using Douglas and Widavsky’s Cultural Theory of Risk to examine north-eastern Thai villagers’ attitudes toward climate-change, Suthirat and Takashi (2013) identified that the villagers predominantly belonged to the ‘fatalists’ group. It means that, for the villagers, the climate-change problem was too big and too advanced to solve. According to the grid-group theory, therefore, climate-change policy is irrelevant to the fatalistic Thai citizen, for whom the environment is something that cannot be controlled. The authors found that negative emotions and denials, as well as a belief that lifestyle changes could only come about to a limited extent, were barriers to a pro-environmental response. Suthirat and Takashi conclude that policy and media need to reframe climate narratives in a way that empower individuals to make a difference to the problem, thereby minimising ‘fatalistic’ belief and switching the mind set to an ‘egalitarian’ view (Suthirat & Takashi 2013).

How do lay people perceive risk and adaptation? And what is the goal of adaptation? For the Karen community in northern Thailand (Forsyth & Evans 2013), external socioeconomic, political or environmental risks are internalised in terms of their livelihood and daily experiences. Autonomous responses to these changes, for example off-farm diversification, occur in order to maintain resource availability, farming labour, time and profit. Forsyth and Evans (2013) demonstrate that planned adaption as a result of the ‘predict-then-adapt’ approach that seeks to prevent physical change will risk missing the role of human agency in reducing risk. They also point to barriers to

successful adaptation similar to those identified by Adger et al. (2009), namely, uncertainty, perception and adaptation goals that are nested in wider socioeconomic and political contexts.

3.1.4 The Research Gap: Thai Climate Perceptions and Adaptations in the Agriculture Sector

The majority of earlier vulnerability and adaptation studies in Thailand cited above correspond to what Head and Gibson (2012) call the modernist approach to climate-change. These studies have sought to find the ‘facts’ of climate impacts and adaptation. For example, in terms of agricultural impact, Thai Jasmine rice was studied mainly for economic reasons, as part of enhancing food security. More recently, although in Thailand there has been a move away from treating rice as an object of climate study, driven by climate models, this has not led to studies that focus on the other end of the spectrum of the human dimension in climate-change encouraged by Adger et al. (2012), Hulme (2008) and O’ Brien (2011). In other words, rice or farmers as subjects have not been studied in ways which can generate insights into the relationship between society and climate, and the broader and dynamic cultural, socioeconomic and political contexts. More importantly, studies show that rather than identifying changes in weather and climate as problems that needs to be objectively fixed like those proposed by decision makers (see Section 3.1.1), these changes are internalised into community livelihoods. More attention to the unmeasurable characteristics of weather and climate, sense of place and cultural values is urgently needed in Thai climate-change research.

In terms of disciplinary perspective, apart from Kansantisukmongkol et al. (2012), only a few of the Thai studies cited above have explicitly applied theories from social sciences, geography, anthropology or science and technology studies. By exploring the intrinsic meanings of weather, place and landscape following the theoretical research gaps identified in Chapter 2, contributions from these disciplines could take current climate-change perception and adaptation studies in Thailand into new and significant directions. For example, sense of place could be added to Chinvanno’s (2013) physical landscape as a unit of assessment, as well as the affective bonds, the lived and experiential connection between farmers and the surrounding environment in Boonrahong and Unjanum’s (2011) study. Further questions can also be asked with regards to the extent to which deeply engrained ‘fatalistic’ views could be changed, institutionally and politically (Suthirat & Takashi 2013), or in reverse, whether sets of

policies and media could be differently tailored to accommodate various belief systems. Moreover, perspectives from indigenous groups have largely been ignored. Below I also explain why studying rice farmers of northern Thailand could fill these gaps.

3.2 Culture, Environment and Climate in Nan

Given the research gaps I have outlined in Chapter 2 Section 2.5 and Chapter 3 Section 3.1, Nan province in northern Thailand was chosen as my research site for several reasons. Firstly, my main priority was to choose a site where traditional subsistence agriculture is prominent as it is likely to be directly and fully affected by changes in weather, seasons and landscape. Among northern Thai provinces, Nan remains relatively agriculture-based, compared to industrialised or tourist cities like Chiang Mai or Lampang. Subsistence livelihoods, not for commercial purpose, complement my interest in weather memory, traditional environmental and farming knowledge, and place attachment. Secondly, there is still a lack of research on climate adaptation in northern Thailand, as shown in Section 3.1

Third, there is a wealth of academic studies conducted in Nan province from anthropological and environment-related perspectives: Richard Davis's (1984) ethnographic study on northern Thai myths and rituals of a Nan village; Yos Santasombat's (2008) political ecology work on farmer's struggle and adaptation in a changing world; and Susan Darlington's (Darlington 2003; 2014) study of the Buddhist monks' ecological movement. In addition, in recent years, Nan has been the focus of interest of several local and international non-governmental organisations on climate-change issues, mostly related to forestry, adaptation to disaster and food security. I explain the significance of local environmental movements and external organisations in Section 3.3.

Details about Nan as my site for studying farmer's understanding of weather and climate are given below. In Section 3.2.1, I emphasize the importance of the underrepresented voices and cultures of ethnic minorities in northern Thailand in climate-change research. Next, in Section 3.2.2, I examine the human-nature-spirits relationship following the Buddhist-animist religion that is particular to this region. In Section 3.2.3, I outline how Nan and its climate are represented by outsiders through environmental narratives.

3.2.1 The Underrepresented People of Northern Thailand

As mentioned above, the voice of those who are closely dependent on natural resources are either missing or treated merely as research objects rather than research subjects by climate researchers and decision makers. Moreover, many studies on perceptions of climate-change in Thailand have treated the dominant ‘Thai’ people and culture as homogenous, neglecting the cultural variations of other ethnic groups across the country (except Forsyth & Evans 2013). Referring to the origin of Thai adaptation studies, which was the concern for future Jasmine rice productivity and export, little attention is paid to glutinous rice (except Kawasaki & Herath 2011), which is also consumed in various parts of Southeast Asian countries. Glutinous rice consumption is the ‘key marker of the collective identity’ of lowland Laos, north and north-eastern Thailand, Yunnan (Southwest China), and northern Vietnam (Falvey 2005; van Esterik 2008). Notably, inhabitants of these regions are *Tai*, the largest ethnic family in northern Thailand and in mainland Southeast Asia (Davis 1984, p.23), linguistically and culturally distinct from the contemporary Thai or Siamese of Central Thailand, despite belonging to Thai nation-state politically and historically (Davis 1984; Golomb 1976). Tai ethnic groups have a slightly different view towards nature and a different way of life, influenced by dependence on natural resources, Buddhism and animism (see Section 3.2.2).

Although the current distinction between Thai and Tai people is somewhat blurred, the latter marginalised groups are potentially more vulnerable to changes in climate than the contemporary Thai due mainly to their agriculture-based economy that is highly dependent on natural resources and conflicting management policy (Northern Development Foundation 2012) (see also Section 3.3.1). Conversely, it could be argued that ethnic minorities in the context of climate-change still remain understudied: exceptions are the Karen communities on the Myanmar-Thai border (Forsyth & Evans 2013), and Muslim communities in the southern part of Thailand (Arunothai 2006).

For these reasons, I wanted to study people who live with, and attune to, weather, seasons and rice, thereby reversing the dominant trend of north-eastern studies that focus more on climate impacts. This intention also follows Adger et al. (2012) and Forsyth and Evans’s (2013) suggestion that adaptation studies should not ignore the role of human agency, culture and socioeconomic factors. In addition, most agrarian studies in northern Thailand pay little attention to climate-change issues. Hence, this

research sought to merge climate perception and adaptation research with existing anthropology and political ecology studies in northern Thailand. The outcomes of the study represent some of the voices of marginalised groups and other Tai-related ethnic branches that share a cultural affinity within Thailand and in other parts of Southeast Asia.

Studying the rice farmers (of Tai ethnicity) of northern Thailand enriches and expands current studies of the human dimension of adaptation in the agricultural sector. The attempt to put culturally marginalised group of people before climate offers a new approach to studying how people perceive changing weather and climate. In this way, belief systems, traditional knowledge and relationships with the surrounding landscape are understood and respected as a prerequisite for interpreting perceptions, adapting to changes in climate, and formulating policy.

3.2.2 Muang Cosmology and Relationship with Supernatural and Nature

Most anthropological studies of northern Thai culture and belief systems are written in Thai language, for example in the edited volume of the Siam Symposium in 1989 (Khanittanan 1989; Vichid-Vadakan 1989). In the English language, I refer mainly to the work of Richard Davis (1984) who documented life and rituals in a village on the outskirts of Nan in the 1980s. The review below is selective in that it focuses on studies relevant to this thesis – the human, culture, weather relationships – and is by no means an exhaustive description of northern Thai cosmology.

Davis noted that the inhabitants of northern Thailand who are of Tai Yuan ethnicity call themselves Muang people (Davis 1984, p.23). Muang people are largely comprised of farmers or peasants living and working in the lowlands. Based on a series of ethnographic studies of farming communities in northern Thailand, Yos Santasombat suggests a broad definition of a lowland Muang peasant as ‘one who has ability knowledge and skill in utilising paddy land to create various products’ (Santasombat 2008, p.144). He also adds that their knowledge is not confined to planting glutinous rice but extends to fruit, vegetable, fishery, poultry and cattle, for both household consumption and for sale. Moreover, these peasants are dynamically engaged in non-agricultural wage labour.

Accordingly, I use the word Muang to refer to the Tai Yuan ethnicity and northern Thai people interchangeably to refer to those in the lowlands and/or in the city area who engage mainly in agricultural livelihoods. This is not to generalise all inhabitants of Nan as I am aware of other ethnicities in other geographical areas, for example, Hmong, Mlabri, Lawa and Lue who have different, though related, cultural belief systems.

In Muang cosmology, animist in its origins and later incorporating Buddhism (Davis 1984), humans have a dependent and reciprocal relationship with nature, and most natural elements including animals have *pui* (spirits) and *tevada* (celestial beings or deities) reside in them. The Muang people's belief in the supernatural has led Davis to identify Muang as 'fatalists', according to Mary Douglas's grid-group Cultural Theory of Risk (see also Suthirat & Takashi 2013). Because of unpredictability in life, offerings have to be made to maintain a stable relationship (Davis 1984, p.77) with important deities: Lady Posop/Kosok the rice goddess; Dharani/Toranee the Mother Earth and the granter of favours and protector against forces of adversity; and Naga the giant serpentine creature who brings water, rain and fertility.

Davis (1984) contends that water is the most important and most auspicious natural element that allows humans to connect to deities culturally and spiritually. Muang rites, therefore, reflect the significance of water and seasons in an agrarian society. In summer (mid-April – Thai Songkran and Muang New Year), which is the hottest time of the year, water is thrown gently at people as relief from the intense heat. On this auspicious New Year's Day, monk's holy water is also used to purify the past year's adversities and revitalise the new agricultural season (Davis 1984, pp.146–147). The rocket launching rainmaking ceremonies during the rainy season symbolise Muang people's belief that the mythical Naga serpentine uses its tail to whip the Ocean Water to generate rain (symbol of semen) to impregnate Dharani, the mother Earth (Davis 1984). Therefore, the Naga rocket is sent up into the sky to drive the cycle of water and connect the sky with the Earth.

Naga is also an important predictor of rain. In Muang pseudo-astrology, it is believed that the number of Naga (usually about 7-8) 'playing' in the Universal Ocean determines the amount of rainfall in a year (Davis 1984, p.130). As the creatures whip their tails, certain proportions of rain fall onto different places in the universe, for example, 10 percent onto the Universal Ocean, 20 percent onto the Human World, and 5 percent onto Himmaphan forest, and so on. The number of Naga and amount of rainfall are

‘calculated’ using complex traditional astrological numerology, and the figures are obtainable from Buddhist monks and the Muang almanac during the Muang New Year (Davis 1976). This predictive power determines the likely annual water availability, and is important for agricultural planning. The significance of the Muang almanac is discussed in Chapter 7, Section 7.1.2

Another deity of fertility closely related to Naga is Upagrutta (Davis 1984, pp.223–230), a noble Buddhist creature living at the bottom of the sea, worshipped for protection against ‘violent rainstorms, broiling sun, wild animals, fire, illness, and conflicts’, caused by evils that destroy crops and the rainy season (Davis 1984, p.227). Similarly, in a chanting text for a ceremony for bringing back *kwan* (energy/life) to the rice granary after rice harvesting during the winter, Davis (1984, p.252) documented two other celestial beings who were worshipped for the stability and prosperity of the three seasons.

Muang rites show that in the twelve-month cycle, the worship of deities promises regularity of season, and therefore crop fertility, the two most important things in a farmer’s life. In a broader view, communications to the supernatural allow humans to utilise and live with the physical nature as cultural resource. While the physicality of nature serves as sustenance and nurture for humans (Vichid-Vadakan 1989, p.427), the deities and spirits that reside in physical nature serve as mental comfort and security (Khanittanan 1989, pp.235, 238). Importantly, through rituals, Muang people only worship deities to influence the performance of physical nature, not to control the cosmos. When things do not occur as expected in the ‘orderless cosmology’ (Davis 1984, p.73), or become inauspicious, they are open to multiple explanations of cause and effect, as Davis puts it:

...as long as the cosmos is ultimately mysterious and incomprehensible, it can generate a broad spectrum of theories to explain the failure of a business venture, the sudden illness of a daughter, or an unexpectedly poor rice yield. If rites directed to the diagnosed causal agent do not prove to be effective, there are always alternative theories to turn to.

(Davis 1984, pp.78–79)

Central to this is that nature and culture are seamlessly connected through morality, operated by the belief in spirits and deities. Unlike in some Western societies that attempt to purify nature from culture (Latour 1993), as Vichid-Vadakan (1989) suggests

and the next subsection concurs, Muang cosmology should be seen as a complex tripartite, involving the supernatural, physical nature, and humans, in a way that these three spheres are 'separate, yet intimately interactive and mutually influential' (Vichid-Vadakan 1989, p.427). The state of each of these constituents and relationships between them are, however, impermanent, following the Buddhist rule of karma and cyclical birth and death (Vichid-Vadakan 1989).

Throughout history, Muang people have been dependent on nature for their resources. With their animist belief, spirits and deities who live in the physical nature are worshipped, feared and respected by humans: permission is sought from them to utilise nature, and they are asked to influence, but not to overcome, the regularity of nature, the weather and the seasons.

3.2.3 Representations of Nan

Having introduced the cultures of lowland Tai Yuan people, this section illustrates how the physical nature and weather of Thailand and Nan are perceived by outsiders. I have selected official travel diaries, memoirs and/or academic writings by European foreigners (e.g. diplomats, missionaries, travellers) from the 19th century onward that pay attention specifically to the environment, landscape, weather and climate of Nan. Their accounts are unique because of the combination between instrumental recording and personal narration of the local places and weather. More importantly, these are views expressed by individuals from Western societies who have been influenced by the works of science and the Enlightenment. These representations of Nan are to be compared against the realities of Nan in section 3.2.4, as well as the voices of local people as represented in Chapters 6 and 7.

By the end of the 19th century, colonialism saw the Tropics of Southeast Asia subjected to being both environmental and racial sites of exploitation by Europeans and North Americans colonialists (Anderson 2003, p.30). An environment and climate determinism was prevalent, in which extreme heat was used as the main factor for explaining physical and mental health, hygiene and development level of a society. For example, the colonialists believed that extreme tropical heat made Filipinos and Malaysians lazy and primitive (Anderson 2003, p.34). The deadly illnesses caused by heat led to an influx of White doctors, and the practices of the local people were

regarded as unhygienic and culturally inferior and needing to be controlled (Anderson 2003; Livingstone 1999).

Foreign visitors to Thailand in the 19th century also talked about climate in terms of health. Jean-Baptiste Pallegoix, a French Bishop who was assigned to central Thailand in the 1840s, observed that the climate of the great central plains was 'healthy for foreigners as well as locals', but going near the forest was to risk the deadly illness of forest fever (Pallegoix 1854, p.4). In summer, the temperature '...even in the shade, usually rises to 30-35 degrees' (Pallegoix 1854, p.5). The French priest also noted that, when the 'heat enervates and dulls the senses' Thai spicy chili dip could arouse the appetite (Pallegoix 1854, p.108). The influence of climate on adolescence was also observed. Early marriage was explained by the hot climate that made people 'very precocious' (Pallegoix 1854, p.115).

Another travel log by a Belgian Assistant legal advisor Pierre Orts, based on his elephant ride within northern Thailand during 1897-1898, captures beautifully scenes of the cities, surrounding environment and seasons. As with other documents, the impact of heat, diseases and fever feature frequently in his diary. On first arriving in Bangkok in August 1897, it was so hot that his temples beat and his head was humming (Orts et al. 2012, p.8). In the eyes of the European – the eyes that looked for aesthetics in nature – heat became simply an obstacle. Sailing along the Ping River from central Thailand toward Chiang Mai, Orts narrates disappointedly that 'the Ping would be one of the most beautiful rivers of the world without this climate and unbearable heat which forbids us from appreciating it in all its worth' (Orts et al. 2012, pp.11–12). Nevertheless, Orts believed he was able to survive the heat better than the natives due to his superior medical knowledge.

Progressing through October as Orts travels through northern Thai provinces, the temperature cooled down due to heavy monsoon rain, providing refreshing weather. He reported: 'excellent day in all aspect. Beautiful weather, not too hot. We walked whole day in the woods' (Orts et al. 2012, p.115). Arriving in Nan, Ort visited the British consulate, where he met a retired vice-consul of France. Orts describes the Frenchman as violent and untidy with a face 'marked by tiredness due to long sojourns in these climates' (Orts et al. 2012, p.157). In this world-view, bad personality was created from the inside, and poor physical appearance was made worse by the hostile local climate.

The Thai winter seems to be the season that European travellers seemed to enjoy most, partly because they found in it nostalgic echoes of European weather. Pallegoix records the temperature of winter in central Thailand at about 10-12 degrees Celsius, describing the sky as becoming ‘perfectly serene day and night’, and the season as full of ‘celebrations and merry-making’ (Pallegoix 1854, p.5). Orts, in 1897, explicitly compares a misty November morning in Nan province to the European climate: a ‘lovely autumn mist full of scents’ (Orts et al. 2012, p.181). Unexpectedly, a strange rain fell in that month and subsequently resulted in ‘extremely cold days’, which he defined as equal to 16 degrees Celsius in the middle of the day (Orts et al. 2012, p.182). The cold spell was felt up to the end of November; thick fog and icy rivers were also common (Orts et al. 2012, p.192). Nan’s winter also impressed Reginald Le May, a British consular official who, in 1914, described that Nan ‘has that peaceful air of a sleepy old provincial town’ (cited in Goodde 1999, p.367). Scenes of high hills, fields of golden rice, people bathing in the Nan river, and the sound of tinkling cow bells made up his memories of a Nan winter.

Environmental and climate determinism persisted throughout the twentieth century as more diplomats and governors visited Thailand and Nan province. Anderson notes that the ‘Tropics of Southeast Asia was described as ‘both attractive and repellent – of luxuriance, excess, and danger’, and where the whites ‘would feel uncomfortable and displaced’ (Anderson 2003, p.29). The determinist perspective was even expressed by Rapee Sagarik, a renowned Thai conservationist, who argued that the inertness and underdevelopment relative to Western societies were because of abundant and readily available resources and monotonous seasons (Sagarik 1989, p.3).

The combination of instrumental recording, and diaries of the weather and seasons was framed within specific narratives from the West. Travel records show the approximate temperature range of seasons in Thailand as 35 degrees Celsius in summer, and 10 in winter. These numbers, however, could only emerge, and make sense with deep meanings, as bodies and mind are engaged with the weather in a certain place and time of the season. As I will show in Chapter 7 Section 7.1, the temperature range and intense heat that cause bodily discomfort and the unexpected winter rain that these foreigners experienced in the late 19th century could be compared with the experiences of farmers in present day Nan. The difference is that heat, in particular, was framed from within a different worldview. For the Western visitors, it was barely internalised bodily or mentally. Instead, it was seen as something to be conquered by medical practice. For

many present-day villagers in Nan, due partly to Buddhist-animist beliefs, heat is to be simply accepted and endured.

3.3 Environmental Movements and Organization in Nan

By the end of the 20th Century, the region of Southeast Asia was viewed by outsiders as ‘environmentally fragile’ (Anderson 2003, p.30), and indeed, as shown below in Section 3.3.1, Nan has been engaged in a struggle to gain environmental, agricultural and food sustainability due to vested political and social interests. Section 3.3.2 describes Nan’s unique environmental movement and the local non-governmental organisation through a ‘re-invented’ Buddhist-animism tree ordination ceremony by a monk. This movement empowered local people to manage the forest themselves, independent from the state, and led to the establishment of the Hug Muang Nan Foundation, one of the most well-known environmental organisations of northern Thailand. Section 3.3.3 shows that more support has come from national and international organisations for addressing social, environmental and development problems in Nan. More recently, the theme of food security in conjunction with climate-change has featured in many local projects.

3.3.1 The Realities of Nan: Physical, Socioeconomic and Cultural Characteristics

Nan is known as a mountainous province with only 15% flatland (Tourism Authority of Thailand 2015). The mountains are also the source of Nan River, one of the four main rivers of Northern Thailand. The climate is typical monsoon: rainfall during June to September, followed by a winter season that lasts until February, and then an intense summer dry spell between March and May (Davis 1984). Nan’s population is composed of a number of ethnic groups, for example, Thai, Tai, Lue, Lawa, Khmu, Mien and Hmong (Davis 1984), the majority of whom are engaged in agriculture; agriculture production accounts for almost 40% of Nan’s Gross Provincial Production (Nan Office of Agriculture and Cooperatives et al. 2011). Glutinous rice, local vegetables and livestock such as pigs and chicken are grown for subsistent household consumption. Commercial crops include maize, mango, soy bean, tobacco, orange, longan, lychee (Hug Muang Nan Foundation n.d.). In 2007, cultivated land area was recorded as 797,134 *rai*, only 20% of which was used for subsistence rice farming. Land is

increasingly dominated by maize for animal feeds (Hug Muang Nan Foundation n.d.). This is a worrying sign, as will be explained further below.

Agricultural Revolution

Over the past four decades, Nan's agricultural system has been shaped by socioeconomic, environmental and political forces at local, national and global levels. Evidently, there has been widespread government and private company support for monocrops such as tobacco, maize, soy bean and rubber. For example, between 2004 and 2007, maize plantation in Na Noi district increased by 35% and much of the land was without certificate of land ownership (Hug Muang Nan Foundation n.d.). Deforestation has been a major concern for this province as a result of monocrops. In 1976, forest covered 73.65% of the province; by 2007 it had declined to 42% (Hug Muang Nan Foundation n.d.). Intensification of monocrops has replaced and reduced the diversity of many local plant varieties while increasing erosion and water pollution (Santasombat 2008). In one year, the value of chemical use for all crops in the province was estimated to be more than 865 million baht (£16 million) (Nan Office of Agriculture and Cooperatives 2011). The new agricultural system has led to fluctuating market prices and eventually, a vicious cycle of poverty. Recent changes in agriculture have led to concern for food security, especially smallholder farmers who are both consumers and main food producers (Hug Muang Nan Foundation n.d.).

Despite decades of agricultural revolution driven by the government and corporates, Nan still ranks third from the bottom in the entire country in terms of income index ranking (UNDP 2010), where in 2007, a typical rural villager lived under or around the poverty line, which was 1,272 baht (£23) per person per month. Modern agriculture is also threatening livelihoods, local knowledges and identities (Nan Office of Agriculture and Cooperatives et al. 2011). First, although the farmers can earn a good income from commercial farming (but high debt), there is a reduction of natural sources of food to provide for simple household consumption on a daily basis. Second, there is an increasing trend of farmers sacrificing rice fields for growing monocrops and buying rice grain instead of producing for their own consumption (Hug Muang Nan Foundation n.d.). This cycle is a threat to farming identity and livelihoods.

In addition, although the population remains largely agricultural-based and relatively poor, Nan remains a large importer of food (fresh meat and vegetable). In 2007, Nan province imported 1,170 million baht per year (£20 million) of food, and in 2012 the

figure increased to 1349 million Baht (£24.5 million) (Nan Office of Agriculture and Cooperatives et al. 2011). Consumerism, improvement in the education system and job security encouraged the younger generations to leave the laborious work on the fields for more stable, office-related careers in the city. This has left the rural areas populated by middle aged and elderly farmers and the future of traditional farming knowledge and identity remains uncertain (Nan Office of Agriculture and Cooperatives et al. 2011).

It is clear that Nan is not producing enough food for its own people, and at the same time, national and international corporates are taking away resources and capacity for food production from the local people and land. These problems show that, to a certain extent, Nan farmers are vulnerable and lack the capability to resist the external forces for preserving local agricultural knowledge and quality of the natural environment (Hug Muang Nan Foundation n.d.).

A Return to the Traditional Agricultural System

Maintaining biodiversity and an appropriate agricultural system are essential for self-sufficiency and sustainability of Nan livelihoods. In 2011, a forum 'Future outlook: a forum on future direction of Nan's agriculture' was hosted by five governmental and nongovernmental organisations. It concluded that biofuel crops, changes in weather and ASEAN free trade were key determinants of Nan's agriculture and livelihood (Nan Office of Agriculture and Cooperatives et al. 2011). In the pessimistic scenario, mass plantation of corporate-funded biofuel crops dominates Nan's agriculture, and smallholder farmers lose out in ASEAN free trade. The farmers also lack capacity and resilience against the unpredictable changes in weather. In the optimistic scenario, farmers are fighting back against corporate and free trade. They are willing to return to integrated organic farming and self-sufficiency based on traditional knowledge. The forum concluded that, in both scenarios, changes in climate were considered a considerable threat, affecting subsistence farmers who are one of the most marginalised and vulnerable groups.

It was agreed among stakeholders in the Forum that farmers have the knowledge to select, store and share local plant varieties so that they are able to reduce costs and be independent from traders and corporates (Nan Office of Agriculture and Cooperatives et al. 2011). In addition, diversifying crops was seen as strengthening farmers' adaptability to changing biophysical and socioeconomic situations and these practices were presented as ones that could help them to become more self-sufficient. Indeed, a

study of a lowland Nan village by Santasombat (2008) demonstrated that farmers are capable of fighting back. For Santasombat, this is not anti-modernization, but an adaptation involving re-learning and re-inventing identity in order to survive external socioeconomic and political forces, and unpredictable weather. In doing so, the farmers portrayed themselves not only as simple peasants, but also ‘the forest conservationist, and the (plant) genetic manager’; multiple identities that empower them (Santasombat 2008, p.2). It is their purposeful intention to re-create identities that make them ‘flexible peasants’ (Santasombat 2008), defying the classical view that they are backward, spatially static and illiterate (Rigg et al. 2008). The new wave of ‘flexible’ farmers and civic society have been part of a strong environmental movement in Nan, as I discuss below.

3.3.2 Grassroots Environmental Movements

Nan’s environmental movement started in a small sub-district in the countryside where villagers were upset by the government’s controversial ‘green city’ project that had led to massive illegal logging (Darlington 2003). As a result, Venerable Pitak, a Buddhist ecological monk, devoted himself to teaching dharma, that greed for materialism is a cause of deforestation and poverty (Darlington 2003, p.360). In the 1990s the monk created a tree ordination ceremony as a symbolic articulation of the Buddhist-animist ritual that goes ‘beyond merely preventing individual people from harming a particular tree’ (Darlington 2003, p.347). The ceremony is about ensuring that trees are protected by spirits, and people harming or cutting trees without making offerings would be punished by the spirits (See section 3.2.2). Therefore, the trees are no longer unmanaged or government property, but instead become property of the village held by sacred religious belief. In other words, the Buddhist ceremony and spirit work together to make the tree sacred, respected and feared by people, and at the same time empowered people to create a community forest project. Venerable Pitak’s successful tree ordination ceremony became a model for many other villages. A similar ceremony was carried out around the Nan River, to ask for forgiveness and revive the spirits of water.

Importantly, in 1998, Venerable Pitak established a foundation ‘Hug Muang Nan’ supporting the ecological monk’s work as well as networking with other environmental organisations (Darlington 2003, p.358). Working with numerous NGOs in northern Thailand, Delcore notes that, unlike NGOs in other provinces, Hug Muang Nan Foundation is run by young natives of rural background whose own interests are driven by the changes in their communities that they have experienced (Delcore 2003, p.68).

Their goal is to protect Nan identity and environment by reviving and using traditional local knowledge so that Nan people can become self-sufficient (Hug Muang Nan Foundation n.d.).

Joko Learning Centre, established 2002, is one of Hug Muang Nan's satellite organisations, located in Muang Chang sub-district, Phu Piang district, not far from the city centre. Joko established itself as a laboratory for experimental planting of local crop to counter corporate monocrop movements. Over years of working with groups of farmers in Had Ket village, next to Joko, they have finally stabilised local glutinous rice varieties called Wan1 and Wan2. These two rice varieties have become common and have replaced the government's varieties. The story of these 'genetic managers' is thoroughly documented in Santasombat's work (2008). In 2006, a major flood washed away Joko's rice seed bank, and led to more long-term planning, and a new development goal: for farmers to be resilient against changes in climate.

A few other Thai and/or Nan-based organisations with climate-tailored goals include RaksThai Foundation and The Regional Community Forestry Training Center for Asia and the Pacific (RECOFTC). Their work focuses on forestry and ethnic minority groups in remote areas of Nan. RECOFTC's work is discussed in detail in Chapter 8.

3.3.3 Key International Organisations Tackling Nan's Food Security and Climate-change

There are (at least) four international organisations that have conducted climate-change research or projects in Nan province, namely GIZ, CBDC/SEARICE and EuropeAid. The first is a cooperation between German International Cooperation (GIZ) and Thailand's Office of Natural Resources and Planning (ONEP) that was launched in 2009 as part of the Thai-German Climate Protection Policy Project. After assisting the draft of Thailand Climate Master Plan, GIZ chose Nan province and its municipality for the climate policy to be implemented (GIZ 2013). The German team wanted to transfer the climate-change framework and experience from Bavaria State to Nan, especially with regards to resilience against floods and energy efficiency. In 2009, GIZ contacted Nan municipality to initiate talks on climate policy, and in their second phase in 2012, the policy was discussed and implemented (GIZ 2013). The details of their work are critically examined in Chapter 8.

Three other organisations are Community Biodiversity Development and Conservation Network (CBDC), South East Asia Regional Initiatives for Community Empowerment (SEARICE), and European Commission's Development and Cooperation, known as EuropeAid. Both CBDC and SEARICE can be thought of as one identical organisation, as they work together. CBDC/SEARICE and EuropeAid deal less directly with protecting against changing weather but more on enhancing the food security of Nan smallholder farmers in rural and remote areas, while acknowledging that changes in climate are reinforcing the vicious cycle. Their food security projects were implemented through Joko/Hug Muang Nan. Below I provide more detail of these three organisations.

In 2012, CBDC/SEARICE and Hug Muang Nan conducted an unpublished research entitled 'Communities and Climate Change: Studies in Rural Risks, Responses and Resilience to Impacts of Global Warming'. The research project used primarily informal interviews to ask 20 female farmers aged between 45 and 55 about changes of climate from past to present, cause, impact, and adaptation in relation to farming. In general, most farmers agreed that today's climate is hotter, drier and becoming more unpredictable, especially the rainy season. Only some farmers explained that these changes were due to 'global warming'. Climatic impacts negatively affected water supply, and increased diseases and pests, leading to lower productivity and income. About half of respondents believed reducing waste burning, and reforestation or banning deforestation were the solutions.

EuropeAid, which is a part of European Commission's offshoot programme called Technology Transfer for Food Security in Asia (TTFSA), initiated projects that took a similar direction. In the context of the Asian agricultural system, a EuropeAid report describes Asian subsistence farmers as increasingly vulnerable to changes in climate and other environmental problems because of the lack of capacity, knowledge, market opportunities and a functional infrastructure (EuropeAid 2012, p.9). To combat such problems, one of the projects set up in Nan province was entitled 'Enhancing Food Security for Smallholder Farmers through Participatory Knowledge Creation and Multi-Sector Collaboration on Sustainable Agriculture and Natural Resource Management' (March 2012 to February 2016). The project was funded by the EU and implemented by Joko and Gift for Life Foundation, with the nickname 'EU project' or 'EFS project'. The overall aim of the project was to enhance food security for smallholder farmers

within a period of four years through a bottom-up, self-reliant and sustainable system with support from local authorities and government agencies.

The project was set up in villages of three river basins of Nan: 1) Nam Meed; 2) Nam Wa/Nam Jam and 3) Khun Samun. Out of 159 farmers who live in environmentally vulnerable areas, 13 of them belong within Muang Chang sub-district. There, the project has established the Farmer Field School as an experimental field for integrated farming, and to transfer knowledge and assist in climate adaptation by collecting seed varieties suitable for different climatic conditions (EuropeAid 2012, p.12). The School emerged as a result of the 2006 flood that destroyed the local seed bank noted above. The 'EU project' in collaboration with Joko is also discussed further in Chapter 8.

3.4 Summary

I have shown the different ways in which the physicality and idea of climate are interpreted in Thailand by various groups. From the perspective of lowland Muang people of Tai Yuan ethnicity in Nan province, weather has been part of their agrarian livelihood for centuries. For these farmers, (ir)regularities of weather and seasons are to be accepted, internalised and coped with, but not to be overcome or fixed. Bad weather, instead, reflects inappropriate human behaviour toward the supernatural. In other words, changes in weather are understood culturally and morally through worshipping spirits and deities. This fatalistic worldview is indeed different to that of European colonialists and the missionaries of the 19th Century who travelled to Southeast Asia and Thailand. The heat of the tropics, especially, became an obstacle for place-making for the travellers; it impeded the journey toward a place, the ability of the eyes to capture the beautiful scenery, and the ability to stay healthy. Influenced by a different climatic system, and by modern scientific knowledge, the tropical climate was seen as a dangerous and uncomfortable one that needed to be managed and conquered.

In the 21st Century, climate dangers are of a different scale. This time, it is the global climate that is impacting places in Southeast Asia, rather than local climate affecting foreigners in the past. Yet, the discourse of fixing the climate is prevalent. The task of solving climate problems seems to be put in the hands of 'experts' who hold more authoritative, and modern scientific, knowledges. Is there a space for non-scientific ways of knowing the world, or for marginalised groups? Could decision-makers learn

from Venerable Pitak who re-invented a traditional moral-based practice as a way of combating changes in society and the environment? For this thesis, I see weather and climate as inseparable parts of culture, rather than climate as an external entity that affects local culture. This is a reverse of the current trend in climate adaptation studies in Thailand. In this way, as I show in Chapters 7 and 8, Muang people's human-nature-supernatural ontology is used for examining external climate ontologies, whether from colonialists, scientists, decision-makers, or external organisations.

Chapter 4: Methodology

The methodology outlined in this chapter follows the non-modernist approach to climate I introduced in Chapter 2. It seeks to embrace the ontological and epistemological diversity of climate knowledges, and allow the weather to tell stories about the lives of the people I met. I start by problematising the conventional climate adaptation approach and seek an alternative from a cultural perspective. (Section 4.1). I propose ethnography as a research approach for examining weather stories from the field site in Nan province, northern Thailand. In Section 4.2, I outline the five methods used for answering my three research questions to gain an account of weather stories told by people: ethnography, participant observation, life story interview and photo-elicitation methods. There in the field, immersed in their lives and activities, I extracted the stories that would answer Research Questions 1 and 2. For Research Question 3, I used elite/expert interviews to gain insights into how organisations conduct climate adaptation projects and communicate climate information to the participants. Life and weather stories, and interviews from organisations are analysed using narrative and discourse analyses. Section 4.3 summarises the methodological approach and methods. This short chapter is to be read in conjunction with Chapter 5, where I explain how these theories were actually implemented in the field.

4.1 Problematising Methodology

Since the primary aim of the research was to explore how local villagers of Nan experience and make sense of the weather, it was crucial that my methodological approach be capable of ‘capturing climate’s ontological and epistemological diversity’ (Popke 2015, p.4). The approach was also needed to give voice to the nonhumans, and attend to bodily, sensory, feeling and affect, processes and moments that emerge from interactions (Country et al. 2015). This is to turn to a more-than-human methodology that decentres the human, allowing others to tell the stories of humans (Whatmore 2006). The outcome is a cultural approach to climate adaptation study that is a *reverse* of the scientific ‘predict and adapt’ approach (Adger et al. 2012), which, in the context of Research Questions 1 and 2, and in climate adaptation research in general, considers three important things: place, nonhumans, and knowledge plurality.

First, following Country et al. (Country et al. 2015, p.271), I recognise the importance of the research site as not only a ground for physical interactions, but as encompassing all the beings (humans and nonhumans), affects, memories and relationships that co-constitute itself (Ingold 2000). Second, following this relational ontology, humans are only a part of the complex web of relationships. As for the researcher, he or she needs to be attentive, sensitive to the ongoing messages of plants, animals, land, spirits and so on that constitute the world and animate humans (Country et al. 2015, pp.275–276). In other words, this is to see the role of nonhuman living things and objects, as well as livelihood and wider socioeconomic and political context that influence how humans construct weather meanings (Burnham et al. 2015, p.24). Third, given that knowledge and meanings arise from everyday practice, there is unavoidably multiple interactions and multiple epistemologies of weather (Yeh 2015).

With these points in mind, below I propose ethnography as a suitable methodological approach for capturing the unique weather stories from the agricultural fields of Nan, Thailand.

4.2 Ethnography: an Approach for Exploring, and Creating an Account of, Muang Chang Weather Stories

Below in section 4.2.1, I first outline the potential of ethnographic research for a thesis such as this and argue that it acts both as an appropriate research framework and as offering an account of weather stories. Moreover, this is an approach that destabilises the boundary that separates humans from external material, and that which separates the researcher from the farmers who live in their weather. From sections 4.2.2 onwards, I introduce participant observation, life story interviews and photo-elicitation, as part of an ethnographic framework for conducting field research. Elite/expert interviews were conducted with external organisations, outside the field site. Narrative and discourse analyses were used after I had compiled and transcribed my data. I argue that this multi-method approach helped gain understanding of the subjective realities of weather changes of individuals and of organisations' climate adaptation projects.

4.2.1 Ethnographic Research

The goal of ethnography is to develop a complete – or 'thick' – description of the culture of a culture-sharing group within the same place (Geertz 1973). It describes

patterns in a group's mental activities, rituals, customary regularities, ideas and beliefs expressed through language and material activities (Creswell 2013; Fetterman 2010). Ethnography reveals the different factors that make up the context in which lives emerge and act as processes that shape these lives. Fundamentally, ethnography draws out the importance of place; as Crang and Cook (2007, p.10) put it, 'biographies and identities are created from stories and action and experience with the world at multiple places and times, and hence the ethnographic research is always socially and materially situated'. In the context of rural spaces in Thailand, the relations between people and place go beyond the geographical unit of analysis at 'village' level because of the flows of dynamic and changing histories, ideologies and values (Anan 2012; Yos 2012). In a situated place, nonhuman living things and objects serve as references and reminders of identity and practice, and, in the context of this research, how weather meanings are constructed (Hall & Endfield 2016). For example, summer is known by water levels in a pond, and water bills, the colours of the fields and heat felt on skin. These things are 'reflections or symbols of the already established social relations and practice, or that they are performatively or practically, and discursively produced, maintained and given significance' (Tilley 2001, p.260); an ethnographic perspective recognises both the busyness within a particular place, and its porosity.

Thus, the ethnographic approach can capture the multiple realities of weather explored in this thesis. Together with the cultural turn, the approach sees that subjective realities of each individual are no less real than the realities that are objectively defined and measured from a scientific perspective (Fetterman 2010). Moreover, ethnography makes no prior assumption of the studied phenomena, and creates intersubjectivity by allowing researcher and researched to produce a negotiated version of reality – in the case of this research, the participants' weather stories (Paschen & Ison 2014). Doing ethnography, therefore, is a subjective and reflexive project.

In conducting ethnographic research, following Creswell (2013), the researcher chooses a site which contains group(s) of people who have developed the same values, beliefs and assumptions, within a unit of analysis of at least 20. The researcher immerses themselves in the research site to make regular observations, and be part of the phenomenon he or she is observing (Crang & Cook 2007). Attention is paid to behaviour, the use of language and artefacts, social relations, cultural events and the functions of political structures (Creswell 2013). It is important to maintain what Atkinson et al. (1998) call 'anthropological estrangement' to make the phenomena

unknown to the researcher in order to gain fullness and richness before examining the phenomenon. This approach also applies to a native researcher like myself even if I have some prior expectations of my own Thai culture (Paritta 2012) (see Chapter 5). As the research progresses, Fetterman (2010) advises engaging more closely with key informants for cross-checking information and synthesising the researcher's observations.

The strength of the ethnographic approach outlined in this section lies in its recognition of multiple realities that shape and are shaped by human and nonhumans within place, and the wider social, cultural, economic and political processes (Crang & Cook 2007, p.14). It pays attention to subjectivities and the intersubjectivity between researcher and participants (Bryman 2012, p.432). Throughout Chapters 5, 6 and 7, I describe people's livelihoods and ways of understanding weather in a way that is accurate and familiar to the insider (emic view). At the same time, I also interpret such understanding by drawing from theories and concepts (etic view). In the next section, I explain how participant observation, life story interview and photo-elicitation accord with the ontology, epistemology and methodology of the (ethnographic) approach that I chose for my research.

4.2.2 Method 1: Participant Observation

Participant observation, as part of an ethnographic approach, is 'not an external method administered on research subjects like questionnaires or lab test, ...[but]...it is a way of being with familiar and unfamiliar life-worlds (Clifford et al. 2010, p.117). By being immersed in a community, the researcher is less of an observer and more of a participant in everyday routines and experiences. The main task is to engage with all one's senses and emotions and to make notes on observable patterns. In addition, a personal diary should be kept for self-reflection such as lessons learnt and personal feelings, including impressions, reactions, problems and surprises, changes in plans, and the nature of the researcher's identity and relationship with people and places (Crang & Cook 2007, pp.51–52; Fetterman 2010, pp.37–38; Laurier 2010, p.119). Participant observation not only allowed me to gain direct access to the phenomenon in question, it also allowed me to develop long-term close relationships with the participants (Bryman 2012, p.493).

While being fully immersed in a community, Flick (2009, pp.128–129) adds that the researcher still needs to maintain a professional distance, otherwise they will risk 'going

native' and lose the 'critical external perspective and unquestioningly adopt viewpoints shared from the local inhabitant'. In terms of research identity and positionality, Crang and Cook warn that the research should always question why the researcher 'gets into certain situations, places and times because the appearance of researcher, be it clothing or social status' (2007, p.42). Even when sharing the same spoken language with the participants, the researcher should be aware of the ways in which the geographical and interactional context develop and shape the language (Crang & Cook 2007, p.49). Reflections on my research positionality is found in Chapter 5.

While participant observation captures the present, I also needed to reconstruct farmers' biographies and memories of weather events. This is where the qualitative life story interview can complement participant observation.

4.2.3 Method 2: Life Story Interview

The purpose of the life story interview is to draw out entire life stories that naturally occur as part of everyday life in situ. The gathered information has a natural fidelity to what and how the stories are told (Plummer 2001, p.27) whether they are factual, poetic or metaphorical (Atkinson 2012). The method examines how the life experiences of the participant are weaved into, and reflect, the body, history and society (Harrison 2009; Plummer 2001). In keeping with the ethnographic perspective described above, class, power, institutions are seen as shaping individual stories (Burkitt 2009). In this case, the life story interview is suitable for exploring both the mundane weather experienced daily, and abrupt or abnormal weather events, and how they are constructed to form weather stories.

As with participant observation, the life story interview is conducted informally, the questions emerging from the natural conversations had with participants (Fetterman 2010). The researcher acts as a respectful facilitator rather than an enquirer, bonding with and sharing the meanings of life with the participants (Atkinson 2012, pp.123–124). In this regard, Flick (2009) recommends starting off with 'grand-tour' questions to get the broad picture and avoid the short, rehearsed answers that are routinely given. Asking about the whys and what reasons allows the participant to recall and reveal their own versions of events in their own words. However, Flick (2009) warns that life story interview is not an open interview; it requires good generative questions to get specific answers, such as crucial decisions taken, the best memories, struggles in life, and so forth. These recommendations are certainly applicable to enquiring about weather

memories. For example, in the field, I have asked about the most and least favourite weather events or seasons; a significant climatic hazard that has happened in the community, and the decision and strategies taken to tackle such a problem.

Participant observation and life story interviews work well together, as the researcher follows the participants' daily activities. Interviewing 'in place' helps participants to situate and illustrate stories with reference to surrounding objects (Crang & Cook 2007, p.62; Riley & Harvey 2007; Hitchings & Jones 2004). While interviewing, the researcher takes note of the body language, the atmosphere of the place, the feeling when the participant is speaking. Fetterman (2010) explains that these gestures reflect the participant's thought processes and the quality of the researcher's questions.

Prior going to the field, I have been approved of my ethical clearance for my research from King's College London (see Appendix A). I have also prepared consent forms to whether or not my targeted participants would agree to take part in my research, as shown in Appendix B. In total, I conducted research with 35 villagers from the field site. The list is provided in the Appendix C. While I had become very close to about half of them, I had treated everyone equally, and followed the protocol strictly. I tried to be present and participate with the people as much as possible. Notes and photographs were always taken to complement my participant observation and life story interview methods. I asked how, for example, a particular event might be carried out differently in different times and seasons, how the same event was interpreted by different people of different age group and professions. I also asked about surrounding indicators used for signalling incoming of weather events and seasons. Importantly, I refrained from imposing my knowledge during my inquiry, and acted as a facilitator. As described in Chapter 5, I tried to position myself as a student to learn from the villagers, although this was not easy at all given my multi-identity.

4.2.4 Method 3: Photo-elicitation

Photographs are useful in capturing the physical location of the research site, and establishing rapport with people (Crang & Cook 2007, p.107). In research, photo-elicitation is a form of interview conducted by showing images to participants in order to stimulate their stories about the people and objects in question (Spencer 2011). Images can be key to hidden messages as 'they have previous entanglements with lives of other people which may prove important to their current roles in society...' (Banks 2008, p.60). Therefore, from a constructivist perspective, an image will always be

viewed differently, depending on the personal and social backgrounds of the participant. Photo-elicitation empowers the participant, avoids prior assumptions about the image taken, and allows the participant, the person who knows best about the image, to describe in their own terms what they see. As Spencer (Spencer 2011, p.33) argues, images provide a form of ‘thick’ description.

The source of the photographs can range from existing photographs taken by participants, or ones found locally by the researcher, or newly generated photographs, taken either by the participant or the researcher. In de Vet’s (2013) work, Australian participants were given disposable cameras and were asked, as part of her research, to take photographs of themes related to the weather in everyday life. Photographs taken were annotated in participants’ diaries, instead of being interpreted by the researcher. The benefit of her method, de Vet (2013) claims, is that it directly captures details of weather-related experiences better and more quickly than verbal accounts. The disadvantages of this method reported by de Vet (2013), and Spencer (2011), is that the participants may not understand correctly the instructions, may forget their camera, be too busy, or otherwise unable to take photographs due to various reasons. Participants may also feel this method is hard work and the quality as well as the quantity of photographs taken by participants may diminish over time (de Vet 2013).

Following these advantage and disadvantages described in de Vet’s work, I set out with a plan to provide disposable cameras for my participants to take pictures about the weather events of their interest. This plan soon ended because, once getting to know the participants, I felt that not all of them were able to dedicate time and effort for me. Instead, I used my own photographs to elicit their opinions. In total, there were four sessions of photo-elicitation processes every three to four months (see Chapter 5 for detail). In each session, I showed a number of photographs to a group of participants and asked how they felt. The same set of photographs were repeated several times with different groups or families in order to gain opinions from most participants in the village. Due to the large number of photographs (in the first two sessions) and shyness of some participants, the information gathered was not satisfactory. In the last session, I then combined photo-elicitation method with a focus group and this proved a much better combination. These reflections are discussed in greater detail in Chapter 5.

4.2.5 Method 4: Elite and Expert Interviews

In this research, the life history interview, which focuses on what ordinary people think and feel, was chosen to answer Research Questions 1 and 2, is. Elite and expert interviews, on the other hand, were used to explore explanations, reflections and justification of climate adaptation projects from the elite/expert's point of view (Bogner et al. 2009; Hochschild 2009), thereby addressing Research Question 3 on the flows and circulation of climate discourse. There are some similarities between an elite and an expert. The former holds a powerful position and is able to make decisions, while the latter may or may not hold a powerful position but has special knowledge related to his/her profession (Bogner et al. 2009). Dexter defines both types of interviewee as 'any interviewee...who in terms of the current purposes of the interviewer is given special, non-standardised treatment' (Dexter 2006, p.18).

For the purposes of this research, the interview involved asking persons who held high positions and/or were equipped with expert knowledge in climate-related government and non-governmental organisations about their involvements with climate-change issues, in terms of history, research, and public outreach. In contrast to the life story interviews which are conducted in the field site, elite/expert interviews are conducted formally (and professionally). During the field work, this involved approaching the targeted interviewee by sending an email and/or calling for an appointment in advance (see Appendix D for an example of email). I followed Aberbach and Rockman's (2002) advice to carry out background research on the institutions and networks involved prior to the actual interview and adopted Hochschild's (2009) recommendation to conduct a probing and open-end semi-structured interview to allow full articulation of opinions. Nevertheless, personal views are inevitable and participants can sometimes exaggerate their importance within the organisation. In this case, Berry (2002, pp.680–681) recommends cross-checking with third-party sources of information and conducting a follow-up interview to help maintain the validity and reliability of the data. Below I explain my method of selecting organisations and interviewees.

The list of the 11 organisations and two individual experts, plus their acronyms and position of interviewees, are provided in Appendix E. The detail of each organisation is provided in Chapter 8. My organisation selection criteria were to gain the broadest range of organisations, but equally, I am interested in organisations that exert some influences in Nan province and in Thailand in terms of climate adaptation in three

aspects: the objective and activities of their projects; the use of climate information and climate communication strategies. The range of interview question is provided in Appendix F. These organisations and researchers were not selected prior to the fieldwork, but through recommendations and snowball sampling once I arrived in the field.

First, I wanted to represent equal voices from three meta-categories, each having distinct interactions and approaches to their participants: governmental, non-governmental/non-profit and academic organisations. The government's top-down approach could reflect centralised vision of global changes in climate, while NGOs' informal interaction might reveal local interpretation of global issues. Academic organisations could help explain the status of current adaptation research in Thailand. Second, I wanted to examine organisations that brought different kinds of (weather and climate) knowledge claims into Nan province, regardless of where they were originally based. These could be organisations that physically interacted with Nan people in meetings or community-based projects, or those that connected to Nan people virtually via television and radio.

Most of the selected organisations and individuals came through snowball sampling initiated from two sources, Nan's Joko Learning Centre's v2, and Bangkok-based Researcher v1. In Nan, JK v2 introduced me to project partners Nan ALRO, an agriculture-related government authority, which led me to Nan ONRE, Nan MUN and Nan TMD, whose roles were in environmental management, Nan Municipality governance and weather forecast, respectively. The interviewees of these three government organisations fall into the category of 'elite' because of their authority in making decisions at a provincial level. The rest of the interviewees, including JK v2 are the 'experts'.

Importantly, I was introduced to the work of GIZ, a German government-funded programme specialised at supporting climate policy in Thailand and Nan. These six organisations were chosen because of their much influential roles in bringing climate knowledge claims into Nan in the form of meetings, conferences, and development policies. I started interviewing them from early 2014 onward.

In mid-2014, I interviewed a Thai researcher, Researcher v1 of Thailand Research Fund, who had over 15 years of experience in climate adaptation to gain an overview of climate adaptation studies in Thailand. He then recommended me to Researcher v2 of

Chiang Mai University, a non-profit organisation Thailand Environmental Institute, and a USAID-funded project called Mekong Adaptation and Resilience to Climate Change (MARCC.) Although both TEI and MARCC didn't conduct projects in Nan, the reputation and research output were well-known in Thailand and Southeast Asia, and could help compare against organisations who have only recently included aspects of climate-change, such as JK.

The remaining three organisations came to my contact indirectly or by chance. First, I wanted to interview an NGO GreenNet who had installed auto-weather stations for smallholder farmers to provide decentralised weather forecasts. But failing to arrange for an interview, I was referred to their project collaborator Climate Change Knowledge Management (CCKM) instead. Second, I accidentally met a senior staff TMD v1 of the Climatological Center at Thailand Meteorological Department (TMD). I learned that TMD team were visiting Nan to give a presentation to local villagers (Appendix G). Finally, in a Forum held at Nan on the topic of 'Holistic Natural Resource Management' (Appendix G), I was introduced to staff of RECOFTC. Their projects were very similar to that of JK, but oriented for sustainable forestry in the highlands of Nan.

Time and practicality were the main factors that limited my selection to only 11 organisations and two interviewees. I had to be stationed at Village M during important events such as rice planting (May-July) and harvesting (November-January), and this conflicted with schedules of some other organisations. This included GreenNet, Asian Cities Climate Change Resilience Network (ACCCRN), and International Union for Conservation of Nature (IUCN). The latter two were sub-contracted by TEI and MARCC (and many others) to conduct fieldworks with local communities on topic of climate adaptation. I also could not arrange an interview with individuals including a Thai scientist who was a contributor for IPCC WG1, and a contributor of Thailand Assessment Report on Climate Change (TARC), an IPCC-like publication. Another person was a former senior staff at Climate Change Management and Coordination Division, Ministry of Natural Resource and Environment. He was specialised in Thailand's climate policy.

Although there were a few important figures missing, I believe that the 11 organisations and two climate researchers met my selection criteria: the diversity of organisations, and the presence and influence of organisations' work in Nan province and Thailand. The selected representatives were robust for analysing how climate knowledge claims are

circulated in Thailand and Nan, and how organisations and communities might interpret climate-change issues to their understanding and purposes.

4.2.6 Method 5: Narrative Analysis and Discourse Analysis

The research involved two types of data: the stories told by the participant, stories about their lives as narrative and the interviews and publication materials from elite/experts and their organisations.

The use of narrative analysis on life stories is mainly to retain the entirety and flow of stories without fragmenting it (Atkinson 1998). This type of analysis is used for Chapters 6 and 7. A narrative analysis of the farmers' life and weather stories allowed me to explore how local cultures were dealing with climatic hazards, and discover how socio-cultural or institutional aspects were influencing local adaptive capacity (Paschen & Ison 2014, p.1084). Moreover, it was also helpful in examining the penetration of climate-change information and how adaptation policies were framed, or 'storied' from the perspective of specific organisations, as Paschen and Ison (2014, p.1085) found.

Discourse analysis is more suitable for analysing the use of language in interviews with and publication materials from elite/expert and organisations. Discourse here is defined as the 'specific constellation of knowledge and practice through which a way of life is given material expression' (Doel 2009, p.490). Analysing discourse reveals how knowledge, power, as well as processes and phenomena are structured by and emerge from interaction within a social context (Nikander 2008). There are two levels of analysis: a textual level and a contextual level. The former allows for close consideration at micro-level of meaning making, and the latter examines the macro-level of hegemonic constitution in places where discourse circulates (Nikander 2008). This method was useful for interrogating the production of climate knowledge in the field and the resulting analysis is presented in Chapter 8.

When analysing data using discourse analysis, it is important to ask: what is the goal of communication? What code, values, or stereotypes does it draw upon, and what metaphor or illustrations does it deliver? What material, power and practices are needed to sustain this discourse? What identity does it promote/suppress/exclude? And what wider context this discourse fits into or contradicts? (Doel 2009, pp.491–492). These questions guided the reading and analysis of transcripts of field note data (from participant observation and life story interview, and from interviewing with elite/expert). They helped to find the overall patterns, specific themes and voices that

are heard or suppressed, which are then labelled and categorised, or known as ‘coding’ (Saldana 2009). Codes are used to inductively interpret meanings, and build overarching themes and theories from the grounded data, which help to generate themes and overarching themes of the overall data (Saldana 2009). Below I explain how themes were derived.

After returning to the UK, I started to prepare documents for data analysis. Generally speaking data analysis is seen as comprising six steps (Bryman 2012; Creswell 2013): transcribing data, reading and familiarising oneself with the data, coding and creating themes, defining and validating themes, and analysing. For narrative analysis (Riessman 2008), I would be specifically looking at the content and structure of life and weather stories told and untold by Village M inhabitants. In examining the wider themes, stories were also compared and contrasted. For discourse analysis (Doel 2009; Potter & Wetherell 1987), I would be looking specifically at the use of language, both spoken and textual, in constructing claims about climate knowledge and communication.

The first important task was to transcribe verbatim my hand-written notes from field notes from participant observation and life story interviews, as well as interviews recorded as audio files from a focus group and series of interview with organisations, into a word processor. The transcripts were in Thai to keep the originality of the language, the flow and thick description. Due to the large amount of data, I decided to copy the transcription in Microsoft Word into Excel in order to create a reference for each sentence from the cell number. Hence, in Chapters 6, 7 and 8, the name of the participant appears with code number in square brackets, for example, [Chaya 293]. The number 293 indicates cell number 293 in Excel, and helped me to navigate through the large amount of data.

The actual coding was done using a qualitative data analysis software, NVivo. After familiarising myself with the data, I started the first round of coding to look for general patterns, followed by a more focussed second round, coding line by line (Saldana 2009). A code book was used to keep a list of codes organised by themes. Each theme and code were also given definitions to make the coding categories more rigorous. There were six themes: identity and politics of place and weather; sources of weather knowledge; weather expectations and experiences; weather observation and signs, human-nature-deities; and adaptation. For example, the theme ‘weather expectations and experiences’, is defined as a collection of codes related to expressions of feeling

about weather memories and actual encounters. Several codes were in this theme, such as 'real', 'fake', 'delayed' and 'good'. A similar analysis protocol was used for the transcribed audio record of a focus group conducted in December 2014. The data from the focus group was coded using the same coding labels as that of ethnographic data. In the following empirical chapters, I indicate data from the focus group as [Chaya F120], where F stands for focus group.

When coding I looked for contradictions and consensus in the data; for example, while winter was viewed as something that people looked forward to, were there negative or disadvantages of winter or did anyone express dislike of winter. Overarching themes were examined critically, matching them with certain concepts in the literatures noted in Chapter 2, and relationships between themes, such as ideas of co-becoming, epistemology of weather, morality, nature-culture-divinity, were identified.

With regards to the interviews with organisation representatives, due to the large amount and detailed verbatim transcriptions of the interviews with organisations, I referenced quotations using the page number in Microsoft word instead, for example [NGO 2]. For the organisations, I coded the data more loosely, which resulted in broader themes, for example, in terms of organisation histories and goals, the role of experts, sources of climate information, discourse of vulnerability and communication styles.

In Chapters 6 and 7, data is presented in a way that illustrates in detail the sensual and emotional experiences of the weather in all three seasons. I intended to select data and quotes that best captured these details so some voices are cited more frequently than others. This is especially the case for Sai and Rin who were the key informants and with whom I spent more time than with other villagers. However, this does not mean that the opinions of other villagers were not taken into account. Rather, if they echo each other, the names of multiple speakers are included in the square brackets, and I also highlight any notable contradictions. I am also aware that many of my key informants were strongly associated with NGO Joko (about five), and their views and desire for sustainable agricultural system were stronger than the rest of the participants. These views emerge in my data quite clearly. I also did not ignore the aspects of gender, identities of people, their roles and power relations in the village. For example, how the voices of the headman and wise man may be relatively more authoritative in explaining weather events than those of other villagers.

4.3 Summary

In this chapter, I have justified the use of ethnography as an approach for exploring and creating this account of weather stories in Muang Chang sub-district. Following the research questions outlined in Chapter 2, I have shown how an ethnographic approach can account for the encounters of, and the relationships between, humans, nonhumans, weather and technology (Popke 2015). The combination of ethnography, participant observation, life story interview photo-elicitation, elite/expert interview, as well as narrative and discourse analysis were used in comprehensively addressing my three research questions. Key to this methodological approach is the awareness of and openness to the plurality of weather knowledges, whether they are from the farmers, scientists or organisational practitioners. It acknowledges that the Western worldview of climate is only one of many views (Yeh 2015). The voices from the farmers are used to question the power that makes scientific climate knowledge dominate other views, with the aim not to reconcile the different epistemologies, but to recognise the validity of each form of knowledge as they arise from different types of practices (Burnham et al. 2015; Klenk & Meehan 2015).

Following this line of thinking, I first conducted an ethnographic study in a village, in order to familiarize myself with the locality, weather, people and meanings people ascribed to the weather and the seasons. Only in a later stage of my field work did I contact external climate organisations for interview. This sequence is important because it allowed me to capture weather stories from the perspective of lay people without being contaminated or influenced by external organisations' climate ideas and narratives. In other words, I gave priority to the villagers' voices.

As I embarked on this process, I was aware of the potential difficulties of each of the methods. For example, participant observation and life story interview required me to be mobile and flexible, accompanying the research participants and 'going with the flow'. They also required not random everyday conversation but well thought through questions that would dig deep into participant's lives. I would also need to be aware of how the villagers perceived me, my perceived status and image and how this might shape some of the answers I received. Photo-elicitation also required planning the source and number of photographs, and how I would control the quality of participant's answers and feedback to the photographs. Interviewing elites and experts entailed I am making appointments and studying the organisations carefully in order to tailor the

interview questions specifically. The analytic approaches I chose meant having my data transcribed ready for coding and thematic analysis.

This methodological approach follows the ontological and epistemological stance outlined in Chapter 2. The five methods exemplify what Country et al. (2015) call methods for attending and co-becoming, allowing the researcher to be part of the phenomenon inside the field site in order to bring out the voices from inside. At the same time, as the researcher, I was open to the place and its inhabitants, in the sense of learning from and being affected by them. In the next chapter, I describe how these methods were conducted in practice in the field, along with how I, as a researcher, was seen and treated from the villagers' perspective.

Chapter 5: Exploring Muang Chang

In this chapter, I describe the physical and socio-cultural characteristics of my study site, and, through adopting an auto-ethnographic and reflexive style, I describe how I actually conducted my ethnographic research and the nature of my relationships with the research participants, following the theoretical guidelines outlined in Chapter 4. First, in Section 5.1, I outline how I chose the study site, and describe its physical and socioeconomic characteristics. Stories of my ethnographic encounters and experiences in the village are arranged in chronological order, starting from winter 2013 (Section 5.2), summer (Section 5.3), rainy season (Section 5.4), and ending with winter 2014 (Section 5.5) as I experienced it. Four themes are woven together: 1) how I came to know the village in general, and my research positionality and relationships with people; 2) my participation in agricultural and cultural activities; 3) my personal experience of Nan weather in the 12 months; and 4) how I employed research methods. I also include relevant data and events which I missed during my study (Section 5.6). Section 5.7 is a summary of the chapter.

This chapter reflects stories of how I, a Thai person, was ‘studying down’ farming livelihood and weather in Thailand, my home country. Despite familiarity with the language, and culture, I could never become a complete insider in the lives of farmers, the agrarian landscape and its changing weather, due partly to my background and life experiences. What went on at the field site was encountered and remembered for the first time, as an outsider, with no prior expectation. This chapter, written as a research diary is used to contrast with the weather experiences described in Chapters 6 and 7 that have always been part of local people’s life. This chapter reemphasises that a complete material, imaginative and symbolic understanding of culture and weather can only emerge from dwelling in a place; it cannot be grasped from a distance. Even my year-long ethnography was not long enough to get the full measure of these interwoven phenomena.

Names of the field site and people throughout the thesis are pseudonyms, and all participants have given their consent for this research. A complete list of participants is to be found in Appendix C.

5.1 Muang Chang Village

The reasons for choosing Thailand and Nan are outlined in Chapter 3, Section 3.2. In short, the combination of the presence of traditional subsistence farmers and the existence of an active civil society and environment-related projects matched my thesis aim of exploring the material, emotional and symbolic dimensions of weather and climate-change. Below I describe how I selected my research site.

5.1.1 Choosing the Field Site: Village M

As described in Chapter 3, Section 3.3, the Nan-based nongovernmental organisation Joko has a large network of traditional farmer communities, and hence I approached Joko as initial gatekeeper. Prior to leaving from the UK to Thailand to conduct my research (September 2013), I telephoned a Joko member of staff, Miss Ing, to introduce myself and asked whether it would be possible to conduct research in the village. The answer was positive and we had further email communications. In the third week of October 2013, once I had arrived in Thailand, I arranged to meet the Joko staff member face-to-face in Nan. It turned out to my surprise that a few of the Joko staff had studied, were studying, or had worked at the Faculty of Social Sciences, Chiang Mai University, which was also where I have previously worked, as a lecturer, although we never knew each other. This was a significant point, which I will later explain.

The Joko team explained that, previously, there had been some collaborative projects in different villages of Nan on agriculture, livelihoods and climate-change (see Chapter 3, Section 3.3), but they were rather less immersive than what I intended to do. For the suitability of my study, three potential research sites were recommended by the Joko team. The first site was within areas where Joko was located, in the villages of Muang Chang sub-district, Phu Piang district, 16 km northeast of Nan city. Another was in Chiang Klang district, about 90 km north of the city. Both sites share similar physical and social characteristics i.e. lowland and hilly topographically and inhabited by semi-commercial glutinous rice farmers of Tai Yuan ethnicity or 'Khon Muang' (Davis 1984). The third recommended site was in the upland area of Doi Phu Kha National Park, Pua district, close to Chiang Klang. Inhabitants were composed of diverse ethnic groups, for example Hmong, Lua and Karen, cultivating rotational upland rice and vegetable farming. There, I would be working with another Thai nongovernmental organisation, RaksThai. While the third site seemed to offer clearer examples of physical and social vulnerabilities as described in Hemwan (2015) than the first two sites, I did not choose

it due to its remoteness and the potential language barrier. More importantly, being close to the City would maximise opportunities to examine the roles and influences of government and nongovernmental organisations (Research Question 3). Therefore, the first site was then selected.

After several communications with Miss Ing and Mr. Jai, the then director of Joko, and the current Chief Executive of Muang Chang Sub-district Administration Organization, I received approval to work in the area. There was an old, unoccupied Health Promoting Hospital located in a village of Muang Chang, which was thought to be suitable for me to stay with, without having to pay rent. Jai and Min, the village headman of which the Hospital was located, agreed to give me permission to stay in the 'house' after giving my contact details and signing my name. There, I was accepted as part of the village, although initially only on paper. To anonymise the name of this village of Muang Chang sub-district, for the rest of this thesis, I call it 'Village M'.

5.1.2 Physical and Socioeconomic Characteristics

Before moving to the next section, I will describe Village M and its seasons in relation to the agricultural calendar. Muang Chang sub-district is about 86 km² in size; it is mostly a plateau cut through the middle by Nan River, which runs on the western side of Village M (Land Development Office 2013) (see Figures 5.1 and 5.2). According to legend, the original name of Muang Chang was derived from a northern Thai dialect, Muang Jang, where *jang* means 'to stop by'. Over centuries, due to its proximity to Nan River, Village M is a small town where people have stopped to take a rest or trade, whether travel by boats or carts, before continuing their journey northward, to Pua, the old capital of Nan. Fruits were brought to pay tributes to Muang Chang's governor. After eating, fruit seeds were thrown away along the roadside, and over the years, these seeds grew. Because of its geographical location and being a trading post, people of Muang Chang became fruit growers alongside the cultivation of traditional glutinous rice and maize farming, hunting and gathering.

In the past 50 years, since the Green revolution and industrialization, lowland rural society has undergone a significant transformation and differentiation, but this has not resulted in complete commercialisation, as Santasombat argues:

On the contrary, changes in agrarian structure corresponding to growing inequality take the form of a multiplication of peasant subclasses in a continuous spectrum ranging from landless labourers,

migrant workers, small producers, petty traders, and large landlords within the social modes of peasant community in which villagers are tied into one another in multi-stranded personalised relations.

(Santasombat 2008, pp.116–117)

Most houses are two-storey buildings or on stilts, originally made of timber, with some renovations using cement (see Figure 5.3).

In terms of climate, the report by Muang Chang local authority classifies the climate of Muang Chang as ‘tropical monsoon’ with three distinct seasons: summer from March to May, rainy season from June to October, and winter from November to February (Land Development Office 2013, p.5). The seasons are indicated in red (summer), green (rainy seasons) and blue (winter) shades in Figure 5.4 and Table 5.1, which shows a 25-year record of Nan climate, measured at Ta Wangpa station, 40 km from Nan City¹. The data shows average summertime temperature just under 30 degrees Celsius but with maximum temperature of up to 35 degrees. Average wintertime was just over 20 degrees but with large diurnal temperature, ranging from 15 to 30 degrees at night-time and in the day time, respectively (see range bars). In terms of rainfall, the observed average rainfall at Nan was between 50 to 100 mm between May to September, and almost none from November to February. As shown below in the next sections, this graph is used to compare these averages with my first encounter with the local flows of Muang Chang weather, as well as with the expectations of local people.

¹ There are three weather stations in Nan province. The first one is Nan Meteorological Office, located at city centre, about 15 km from my study site. Another city centre-based station is an agro-meteorology station, providing information related to agriculture. Another station is located in Ta Wangpa district, 40 km to the north, more focused on irrigation and water resource warning. I was recommended by the Head of Nan Meteorological Office that climate of Ta Wangpa could better represent climate of Muang Chang than data from city-based stations due to topographic characteristics.

Chapter 5: Exploring Muang Chang

5.1 Muang Chang Village

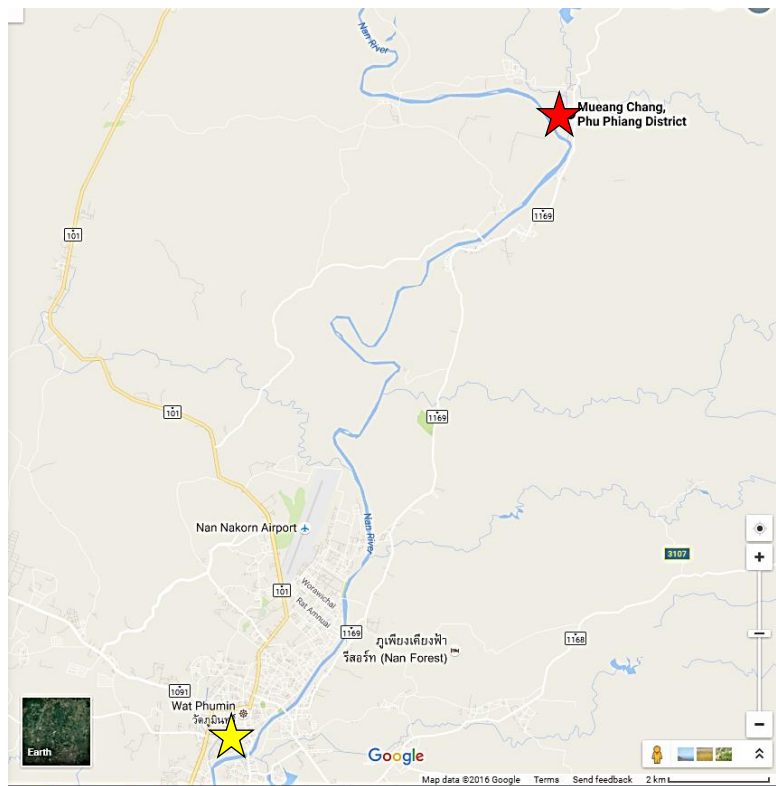
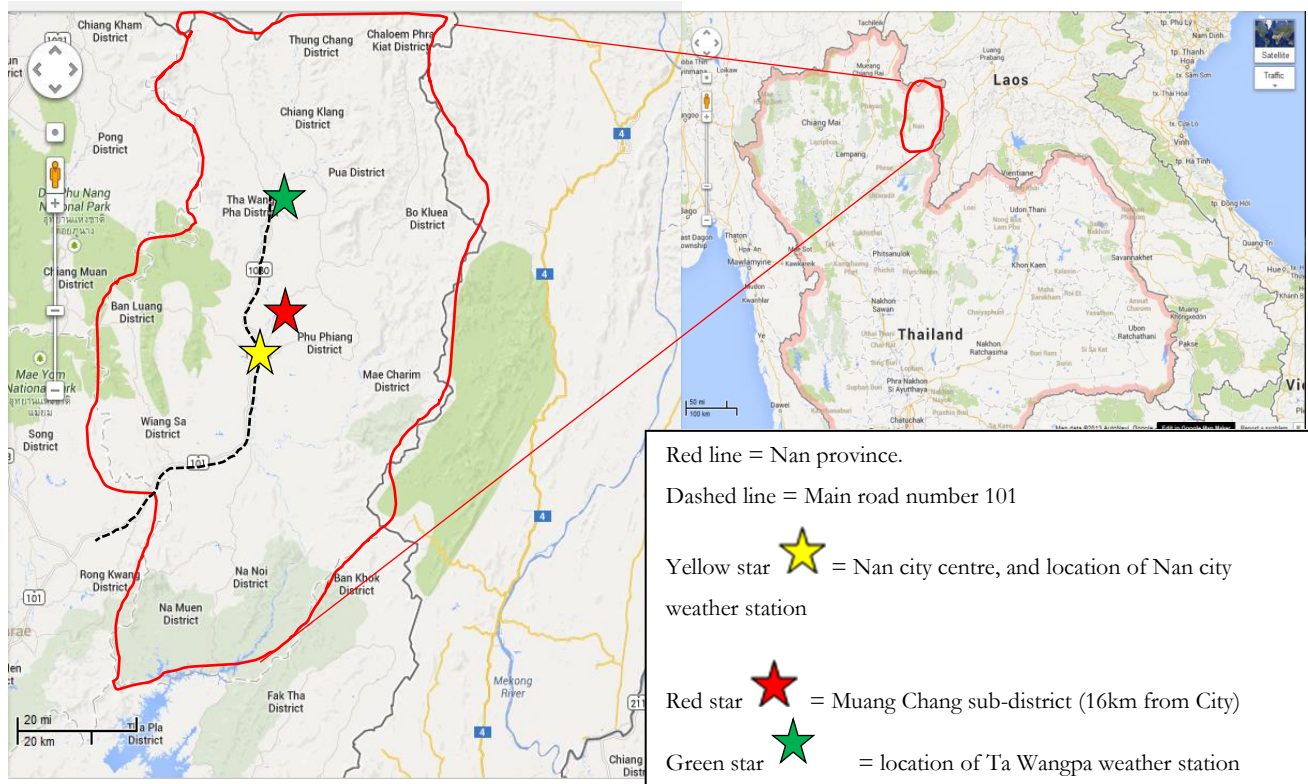


Figure 5. 1 Map of Nan province (top) and location of Muang Chang district (bottom)

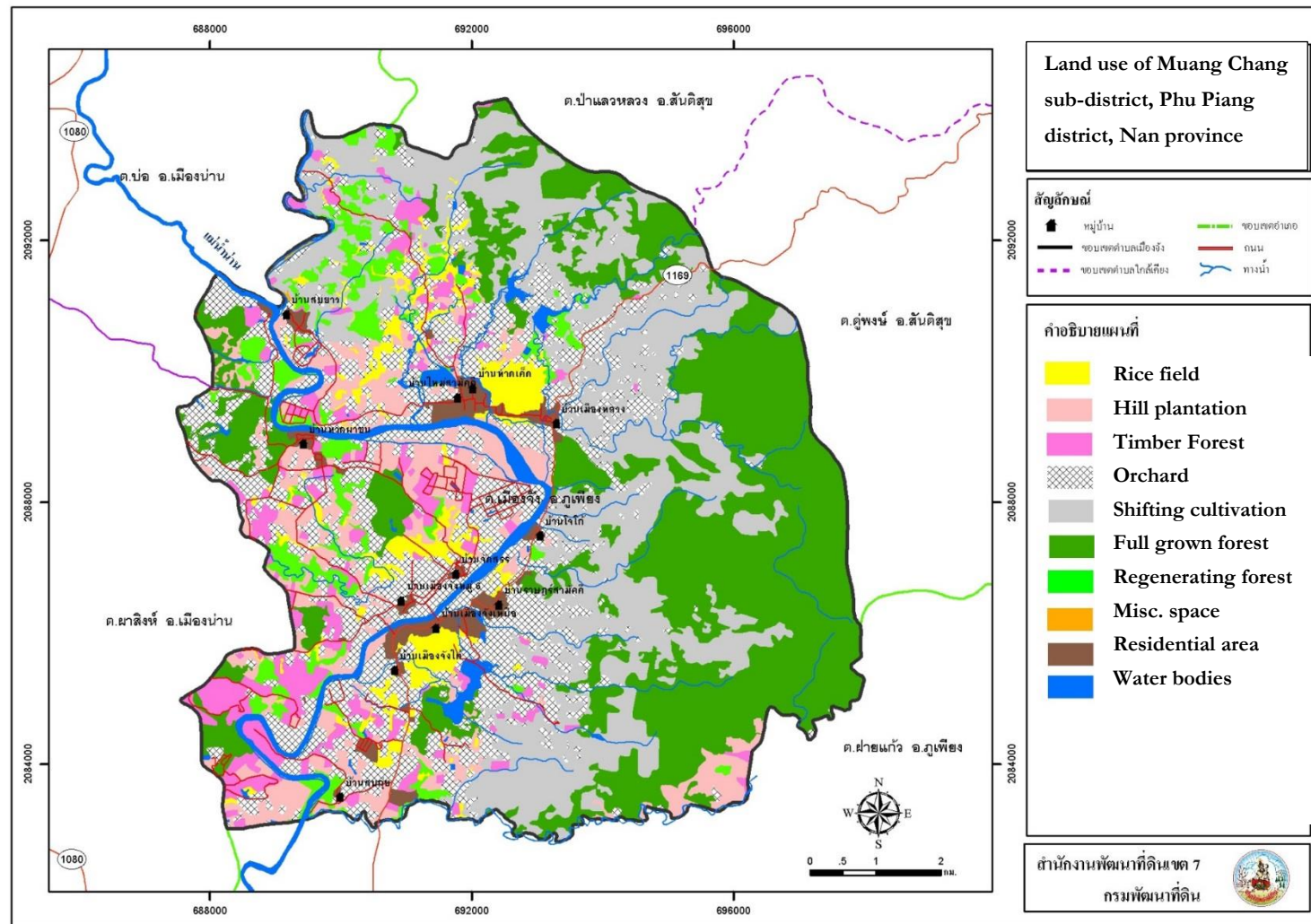


Figure 5. 2 Land use patterns of Muang Chang sub-district (Land Development Office 2013)



Figure 5. 3 A typical house in Village M.

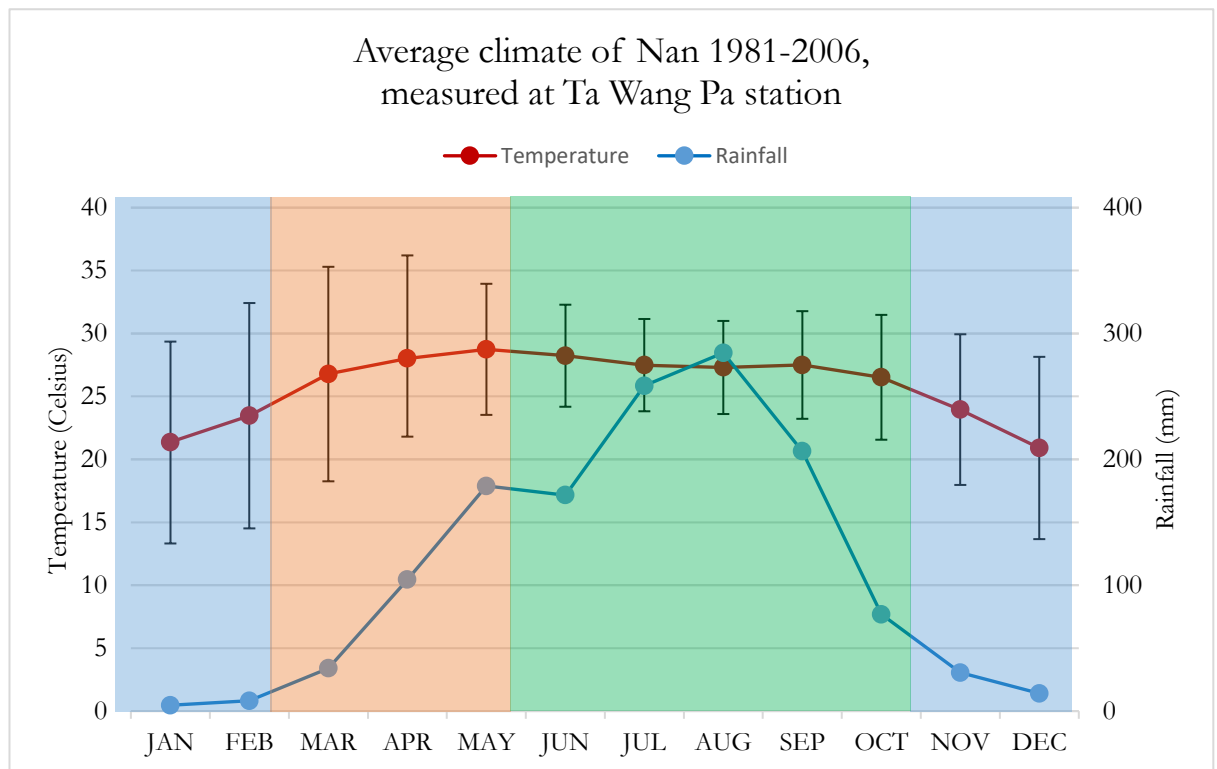


Figure 5. 4 Average climate of Nan province (1981-2006), measured at Ta Wang Pa station. Red line indicates average temperature, with range bars showing average maximum and minimum temperatures. Blue line indicates average rainfall.

	JAN	FEB	MAR	ARP	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Seasons	Winter		Summer			Rainy season					Winter	
Lowland crop						Rice (rain-fed),					Rice (2 nd), Mung bean, tobacco perilla	
Upland crop						Maize					Lychee, mango, longan	
Cultural activities	Forest Ordination (FEB)		Fishing (MAR) Songkran (APR)			‘Taan guay slaag’ or merit-making ceremony (OCT)					Celebration, marriage, ordination	

Table 5. 1 Agricultural and cultural activities according to the three seasons: winter, summer, rainy season.

The population of Village M is about 500 with approximately 140 households (Muang Chang Sub-district Administration Organization 2013). In this village, 80% of all households pass the government's 'poverty line', having earned over 30,000 Baht of income per annum². In terms of occupation, about 45% of people are engaged in the agriculture sector, and most full-time farmers are at least 50 years old (Muang Chang Sub-district Administration Organization 2013). About 20% of villagers are current students and are unlikely to be taking up agriculture occupation, potentially adding to the existing 20% of those already engaged in non-agriculture occupations, such as wage labour and officers outside the village, in Nan and other provinces. The presence of aging farmers and the increase in non-farming occupations suggests de-agrarianisation (Santasombat 2008; Na Nan 2015). However, at the same time, the farmers themselves have tried to challenge the existing agriculture system, as discussed more fully below and in Chapter 6.

The geographies of each agricultural activity vary according to the topography. Previously, over several generations ago, rice, the main staple, and maize, were grown on hills, or *baɪ*³. Nowadays, only rice is grown on the flat valley bottom, in the main rice field of the Village, which was once a forest (see Figure 5.5 left). Fruits have been introduced on the hill slopes instead (see Figure 5.5 right). Until about the 1980s, when irrigation systems and canals were built, all rice fields were rain-fed. While the main rice field is connected to the irrigation line, the fruit orchards and maize plantations are scattered around different parts of the hills, are not connected to the irrigation line and are less fertile. With the geographies of each cultural activity, the movements of people vary greatly in a day, during different seasons and during the entire year (see Chapter 6). For example, a villager usually travels by a motorcycle to visit his/her lowland rice field, then visits a lychee orchard at the foothill and another lychee/longan/maize orchard plus pig farm further uphill, accessible by two single-lane dirt tracks, one towards the 'northern hills' (northeast), another towards 'the southern hills' (southeast).

² In Santasombat's (2008) study in a village of Muang Chang (data collected in 2001), the village's socioeconomic status was classified into four categories, based on income, which strongly reflected the changing occupation from agriculture to wage labour and hence consumption of commodity and rate of rural-urban migration (p.123-126). The 'poor peasant' had an income of less than 12,000 Baht (£260) per year; the 'middle-class peasant' earned between 12,000 to-60,000 Baht (£260-1330) per year; the 'well-to-do peasant' had between 60,000-120,000 Baht (£1330-2670) per year; and the 'rich peasant' earned over 120,000 Baht (over £2670) per year.

³ See detailed description in Forsyth & Evans (Forsyth & Evans 2013, pp.4-5)



Figure 5. 5 Village M's main rice field (top); Lychee orchard grown on hill slope (bottom).

Data from 2013 shows a total 109 *rai*⁴ of subsistent rice registered for 44 villagers (averaging between 2-3 *rai* per person) while the figure for hill slope maize plantation was 383 *rai*, owned by 40 villagers⁵ (Muang Chang Sub-district Administration Organization 2013). These two crops were planted in the rainy season (June to October), and are harvested between November and January. Table 5.1 shows the relationship between agriculture activities and Nan's climate. In wintertime (November to February), mung bean is the most common post-rice crop (300 *rai* owned by 50 villagers), and only a small number of other kinds of beans, tobacco, and perilla. These are planted on the same field that is used to plant rice, although some people do also plant rice during this dry season or leave the land fallow. At the same time, people start to prune their fruit orchards (hill slope) to encourage flowering. Compared to other villages of Muang Chang, Village M is the biggest lychee producer, over 250 *rai* per 82 villagers, while mango and longan orchards are at the average level, about 60 *rai* per 70 villagers, for both fruits (Muang Chang Sub-district Administration Organization 2013). From the summertime (March to May) onward, the dry season crops start to be ready for harvest, starting with tobacco, dry-season rice, soybean, and lychee. Longan and mango are harvested late May to June. In addition to crops, many farmers also raise chicken, frogs, and pigs for extra income. It is also common to grow vegetables such as beans, pumpkin, chilli and various herbs in orchards and/or backyard, meaning that house and fields and orchards are an extension of one another; they all make up the farmers' 'home'.

Despite the decrease in the number of villagers engaged in the agriculture sector, as mentioned above, the farming systems have also changed. As mentioned earlier, the irrigation system has transformed farming system and rice variety selection. It allows the planting of a second rice crop in winter to maximise food security and gaining some profit from selling fruits (Na Nan 2015; Santasombat 2008). All sorts of equipment and technologies are needed to improve yields, for example, water pumps for watering (rain-fed) fruit orchards, machines for saving time and labour for the aging farmers, and intensive fertilisers for improved yield and quality (see Figure 5.6). With the increasing commercialisation of the farming system, farmers have also had to fight against invisible forces that have shaped their knowledges and practices (see Chapter 6, Section 6.2). But

⁴ *rai* is a unit of area measurement: 1 *rai* = 1.6 km²

⁵ The same grower may be planting both maize and rice

at the same time, people are slowly losing the knowledge needed for choosing rice varieties based on judgement of the previous rainfall (Santasombat 2008, p.123). Some of the farmers, especially the middle and upper middle class farmers (see footnote 2) in a village of Muang Chang (Santasombat 2008, pp.124–126), with help from government and nongovernmental organisations, have been trying to demonstrate that organic and modern farming can co-exist in market-oriented economies (Na Nan 2015; Natedao 2011), by ‘recasting the diverse crops and searching for the once-abandoned, low-input local rice varieties and developing them as a strategy for subsistence living’ (Santasombat 2008, p.134)



Figure 5. 6 A rice-harvesting machine (top); a spraying machine (bottom)

Having given an overview of Village M, below I describe how I, an outsider, came to encounter and experience the busyness of agricultural livelihoods through making relationships with people in the village.

5.2 Winter (1)

I officially entered my field site at Village M on 10th November 2013. Upon arrival, I collected the ‘house’ key from a Joko member of staff and arranged to meet Rin, the assistant village headwoman. The Joko employee introduced me to Rin as ‘Ajarn Chaya’ or ‘Ajarn Men’ (my nickname). Rin then introduced me to my new neighbours.

The Teacher

The word ‘*ajarn*’ carries a very powerful message; it means a teacher or lecturer who possesses state-recognised knowledge, or a master or a wise man, who possesses community recognised knowledge (see subsection Bonding below). Because both Jai and Ing were current PhD students at Chiang Mai University, they chose to address me with the prefix *ajarn* with respect to my previous job title (as lecturer), even though I refused and insisted on being called just by my name. This forced other Joko staff and people of Village M to also do so. The hierarchy system in Thai culture dictates that juniors always pay respect to the seniors and the teacher (Wyatt 2003). Being referred to as an *ajarn* instantly forced older people to show their respect to me because of my ‘knowledge’, despite being younger than them. With the goodwill of the Joko people, I was no longer ordinary. My title had advantages and disadvantages in different circumstances throughout my time in the village as will be explained throughout the chapter.

A Stranger in the Field

November was the rice-harvesting season, evidenced by the golden ripening rice field. I had no idea when farmers would actually go into the field and cut it. Nam, my neighbour, told me to visit the demonstration field to obtain more information. I walked there with a cap, a camera, small notebook and a pen, a t-shirt and a pair of trousers. The weather was unexpectedly warm from a Chiang Mai person’s perspective. I have always thought Nan was a relatively cold place and I had started to sweat already during breakfast. There, I met Rin and other farmers, and introduced myself as a student, but later had to admit to being a doctoral student from the UK. Rin still

addressed me with the prefix ajarn. They enthusiastically introduced me to different rice varieties they had been experimenting with. I was overwhelmed by the information. I took photographs and took note of everything as a complete observer.

In terms of language, I could speak the official central dialect fluently, but I was not so fluent in the local northern dialect, although I could understand almost everything. I tried my best to speak the slow Chiang Mai dialect, which led the villagers to make fun of me as their Nan dialect was faster and terser, and I found it hard to understand at first. Some farmers also tried to respond to me in central Thai dialect as probably they could tell I was not comfortable with the local dialect. Paritta noted that in trying to speak central Thai dialect (back to a researcher) local people could be wanting to appear modern and educated, because of its status as the official language, and this language choice suggests the differences in power relations (Paritta 2012). She also contrasts use of the official Thai dialect as indicating distance and reserve, whereas use of the local dialect signifies trust and openness (Paritta 2012, p.209)⁶. Despite some difficulties, I tried to speak the northern dialect to minimize the distance between myself and the villagers. In addition, they saw me as a city boy and were not sure if I could cope with rural life. Not surprisingly, some farmers thought that I was a rice researcher like other visitors. Coming from Chiang Mai, some villagers also associated me with a certain political party. They asked if I supported the 'Red' (reformist) or the 'Yellow' (conservative) group. I politely replied that I didn't support either of the parties, knowing that the majority of Northern Thai, including Nan people were 'Red' supporters (Forsyth 2010; Rossi 2012), and to choose any colour might result in negative relationships in the future.

⁶ This was from Paritta's experience of conducting an ethnographic research in southern Thailand as a Thai PhD candidate from a UK university

These factors, together with the extraordinary student cum teacher status, complicated my identity and resulted in certain forms of power relation. As Kanuha (2000) described, a native researcher

constantly engages in a complexity of balances: as a Third World person in white research institutions, as a Third World academician perceived as white within one's native community, and often as a researcher more oriented to emic, qualitative methods within a still dominant positivist, empirical approach to knowledge generation.

(Kanuha 2000, p.444)

This is what Narayan calls 'multiplex identity', defined as a 'shifting identification amid a field of interpenetrating communities and power relations' (1993, p.671). On this first day, I felt like a complete stranger.

Harvesting 1: Rice

On a day in mid-November, accidentally, I encountered a group of about 20 farmers who were on their way to harvest rice⁷. I asked if I could join them, explaining that I was a student. Partly because of my inappropriate outfit (a cap, t-shirt and shorts), some farmers said, 'go back, it is hot here'. The outdoor weather – intense sunshine, hot and dry with bright blue sky – was unsuitable for the city boy. They were worried that I would get sunburnt and sick. I insisted on staying with them, as it was the first time I would be able to actually observe rice farming. I took photographs, chatted, and took notes, only as an observer. At this stage, the 'get-acquainted' stage (Fetterman 2010, p.8), I still kept my research questions open and exploratory focusing on the following topics: history and identity of Muang Chang and farming traditions; memories experience of being in the field and in different weather/seasons; weather-related tales, beliefs, songs, poems; weather coping strategies and adaptation; weather news and information; environmental/climate-change projects and campaigns⁸. When the day ended, I went to a shop in the city centre to buy a long-sleeve shirt, gloves, and boots in order to 'dress native' (Chawla 2006, p.4), to be able to participate in the field, and

⁷ Usually, the harvesting process involved gathering of family, kin and neighbours numbering between 5-15 people, who were each paid 250 Baht per day by the landowner. In the old days, the number could be up to 40, and workers were treated in return with a sumptuous feast provided by the owner, and they took turns in helping to harvest the rice of each household.

⁸ It should be noted that my questions to the villagers were constantly revised and tailored to specific persons and situations. New ideas and the focus of questions came through my own discovery in the field, discussion with my supervisor, and from reading textbooks.

not be seen as a tourist who took sunshine as an aspiration. Again, this was to minimise distance and otherness between the villagers and myself (Chawla 2006; Narayan 1993).

The following day, Jai asked me to help harvest his rice, located in a neighbouring village. There I met Dan, a student from Belgium⁹. It was our first time ever rice harvesting. Though I had my new clothes ready, I was still nervous. The other farmers taught us to hold the sickle and cut the rice but had to correct us many times¹⁰. After half a day, I felt extremely dehydrated. It was hot and dry, and the breeze did not really help. We rested and joined in a potluck lunch and had casual chat¹¹. In the afternoon session, we took breaks more often due to the intense heat. The harvest ended at 5 p.m. Dan and I went to a coffee shop in the city centre as a reward while the other farmers drank rice whiskey in the field¹².

Busy Farmers, Becoming a Participant and Decisions About a Photographic Method

The following morning was bright and Dan and I joined another rice harvest on Mali's field, the mother of Min's wife. The rice had already been cut and sun-dried for several days; the job on the day was to hand-tie the rice into sheaves before feeding them into the threshing machine to separate the straw from the rice grain. The grain would be collected in a bag, each weighing about 35-40 kg. At the end of the day, Mali got about

⁹ Dan had travelled to many parts of Thailand and ended up staying at Jai's house with the purpose of learning traditional rice cultivation as part of his bachelor degree.

¹⁰ In front of me, there were plots of rice trees, just under 2 m in height, in regular spacings of about 15 cm from each other. They all spread to cover about three rai which I had no idea how much time it would take to harvest. I was taught how to hold the sickle in my right hand, how to grab several rice trees on the other hand, how to cut and place them neatly on the stumps beside or behind. Each process involved constant crouching down and lifting up while slowly proceeding in a forward direction. The eyes, arms, legs and the hands that hold the sickle and the rice become one co-ordinated system, in a streamlined and rhythmic process that left me nervous and afraid of making mistakes. There is no doubt that we were the subject of scrutiny for our posture and style of cutting; we were laughed at and corrected many times before finally being given compliments. It was very clear that we were working at a slower rate than the workers. While our cutting looked messy, the others' looked like it was done by machine, neat and clean.

¹¹ We were encouraged many times not to be shy of eating more, and to 'eat like when you are at home'. This was partly in order to accumulate energy for the afternoon session but also in gratitude, an exchange of free labour, and also to show that there is always plenty of good sticky rice to eat.

¹² The day usually ended with drinking shots of pure local-made rice whisky, believed to ease the aches and pains, together with some food, depending on the host's treat. This ranged from simple grilled pork to a proper meal.

almost 50 bags of rice from her two and a half rai¹³. My participation in the field was a way of re-negotiating my status (Yos 2012, p.86), to try to prove that I was not a typical ajarn, a rice researcher, or a city boy. My involvement in the fields and appreciation of their livelihood were well received, and I became more well-known among the farmers.

I came to realise how busy the farmers were on the field. Even during the breaks, although they might take a nap, they would also chat, make bamboo basketry (*tok*)¹⁴, collect herbs and firewood, or make traps for catching animals. With these activities going on, I found it hard to carry out my auto-photographic method, following de Vet (2013)¹⁵. I consulted Rin, who believed that the farmers would be happy to cooperate. But she also encouraged me to do less writing and shooting of photos and participate on the field more. Following the steps of mobile ethnography (Crang & Cook 2007; Riley & Harvey 2007) and Rin's advice to become more a participant than an observer, I found a wider variety of sources of information, ranging from on the fields, along the road, at a local food store, during lunch or dinnertime, and so on.

After asking another group of farmers about the possibility of doing auto-photography and receiving a negative answer this time, I decided to abandon this idea and continued taking photographs by myself for photo-elicitation later. I also set up a spot for taking time-lapse photographs. I chose this spot to capture changes in the main village rice field, landscape and skyline of the village as part of photo-elicitation. Every few days, at different times of the day for the entire 12 months, I took pictures from this spot in all directions, 360 degrees (see Figure 5.7).

¹³ Dried rice was tied using 'tok', a bamboo ribbon, into a sheaf. About 4-6 rice sheaves, weighing about 15-20 kg, were carried on a farmer's back with a large piece of cloth and piled up in a similar manner to hay stacking. As soon as the threshing machine arrived, these were then fed in to separate the straw from the rice grain. The grains were then stored in a used fertiliser bag, each weighing about 35-40 kg. One rai of sticky rice may produce between 15-20 bags of sticky rice grain, or about 600-800 kg. The process of stacking, threshing and storing grain took about one whole morning. Where the host owns the land, which Mali did, all the rice is kept and shared among family members and cousins. If the host only worked on a piece of land for someone else, he or she may take 2/3 of the rice grain and the rest is given to the land owner as a form of land rental fee

¹⁴ Local bamboo basketry: A medium-age bamboo shoot is chosen and scored with a knife along its length to 'peel off' the very thin layer of the bamboo wood. This piece is then cut again to make 'tok', a bamboo ribbon in a dimension of about 1cm in width and about 50-70cm in length. Three pieces 'tok' are woven into one piece which then forms the basis for making the hat by stitching it together. This was commonly done by both men and women for extra income.

¹⁵ At first, I intended to provide each participant with a camera and allow them to take any photographs in an agreed scope as previously described in Chapter 4.

After visiting different sites in different villages, I decided that I would continue my ethnography research only within Village M. I was also warned that other villages were not safe due to issues of drugs and thefts.



Figure 5. 7 Example of a time-lapse photograph (taken on 10th November 2014). This spot captures the western side of Village M's main rice field. A photograph of the same spot was taken every 2-3 days throughout 2014.

Bonding

By the end of November, the rice-harvesting period was almost at an end while the temperature gradually decreased with some breezes during night-time. December and January was a time for the farmers to rest and celebrate their hard work. I was also kindly given bags of rice as a gift for my parents from those that I helped. My hard work in the field paid off in terms of building relationships. However, I still felt the effect of the prefix *ajarn*. Dan and I would also discuss how our blending into village life resembled the Amish lifestyle – working in exchange for food¹⁶.

¹⁶ Coming from larger cities like Chiang Mai, London, or Brussels was a complete transformation– to give up restaurant food, fast transportation, air-conditioned rooms, internet, and so on. Nevertheless, our experience was still superficial because we did not own land or machinery. Nor did we have to make decisions on and off the farm.

There were particular groups of families with whom I bonded closely: 1) Po and Fa, 2) Pang and Gik, 3) Wan, Jan and Mek, 4) Dang, 5) Pree, 6) Min, Mali, Ton, 7) Rin, 8) Sai and 9) Nam and Nong. Apart from Nam and Nong, the rest were not my immediate neighbours¹⁷, but were those that I often (accidentally) met in the field. Many of these people were core members of Joko and participated in the farmer school project, which I will later explain, for example families 1, 5, 6, 7, and 8 (see Appendix C for description of each participant). A few of them also held special positions in the village. For example, Min was the village headman, and Rin, the assistant headwomen. Both helpfully provided me with information on the organisation of the Village.

Jan was the Village's wise man. Because he was previously ordained as a monk, he had a wealth of knowledge about Buddhism, local culture and customs, ritual ceremonies and fortune telling. He served as the Village's lay religious leader, and was officially called *ajarn* Jan. Approaching him made me uncomfortable because of his official *ajarn* title. I never wanted to be equal or to replace *ajarn* Jan, but I also could not stop others calling me *ajarn*, though with goodwill. Jan very helpfully provided me with a lot of information but never called me *ajarn*. I was only a temporary, even bogus *ajarn*, possessing a different kind of knowledge.

It later became normal that I joined Pang and Gik, Wan and Jan, and Rin for dinner¹⁸, or at least sat down and exchanged a few words with different families as I walk passed. As Niti found, in Thai culture, the dinner table is the place where class and identity between local people and researchers are negotiated (Niti 2012, p.185). For me to decline dinner was to insult the host's self-perceived lower status. Cooperation was key. Dinnertime provided opportunities to bond with and learn from the villagers.

Post-Rice Crops

By early December, people started to worry that the winter did not feel as cold as some might have expected. I also bought a cheap thermometer to help monitor the weather changes, and early morning of the 10th of December, it recorded a temperature of about 13 degrees Celsius but it soon warmed up during the day to almost 30 degrees (see range

¹⁷ Their houses were all next to each other along a narrow road in the village.

¹⁸ They often worryingly asked whether I could eat their food, or how would I cook certain ingredients at home, given that I came from a different place and family background. I replied that most of their food was familiar to me and I often told them about my mom's cooking.

bar in Figure 5.4). The sky was hazy, due to burning of crop stubbles. In the evening of the 16th of December, while I was having dinner with Rin's family, a heavy rain came. Out-of-season rain is rare (see Figure 5.4)¹⁹, and according to the Thai Meteorological Department, resulted in the lowest minimum temperature during the winter season in northern and north-eastern Thailand in 65 years (Thai Meteorological Department 2015). Interestingly, many villagers mentioned the significance of this winter in terms of its persistence, rather than the low temperature, since they have experienced colder winters (see Chapter 7). Days after the rain, the sky was bright blue with a cold breeze. Dan said to me that the weather, cold only during the morning and night-time, was like October in Belgium. Everyone started to wear jackets, hats, and socks, even Dan.

After the New Year, the dry season second cropping began: rice, tobacco, and mung bean planting. Back in the third week of December, Kan and Lai had sowed glutinous rice seed, experimenting with their 'rice seedling' technique²⁰. I had taken notes and photographs along with helping them, and in turn, Lai had wanted to take photographs of me so that 'you can show to other people that you really have been here and done it'. Kan and Lai wanted me to be proud of what I, a novice, had achieved, and at the same time, they were proud of being in my photographs, so that I could show to others their experiments and livelihood.

From December to early February was also the period of maize harvesting²¹. My first maize harvesting trip was with Jan, Wan and the Lai family, and I found the activity very different in terms of topography²² (see Figure 5.8). Around ten of us got on a truck and went about five kilometres from the Village up to a hilltop. It took about one whole day to handpick the maize in a plantation the size of a football pitch²³.

¹⁹ Rin's mother, about seventy years old, said that she never witnessed rain in December in her life.

²⁰ Rice Seedlings are grown from dry seed in narrow strips of planting beds, surrounded by water. This is a concentrated planting where about 20 seeds were planted in each hole in spacings of about 15 cm, in a planting area of about 3-4 land strips of 1 x 4 m. The young plant is allowed to grow for about 50 days to about 15-20cm in height, and then removed and replanted on the same piece of land, which becomes a paddy field covering a much larger area than the original planted up area.

²¹ Because maize is drought tolerant and highly versatile, it can be planted anytime, and anywhere, depending on the owner, though usually they started planting during the coming of the monsoon, together with the wet season rice.

²² While rice harvesting was carried out on flatlands at the bottom of the valley, maize harvesting took place on the hill slopes that were so high and far away, our houses appeared as scattered dots.

²³ The maize plants are brown in colour as they were dried up and ready to be picked. They were planted from the top of the hill to the bottom, about the size of a football pitch. Each person was handed a used



Figure 5. 8 Maize harvesting on a hill slope (top); The ‘barren mountain’ caused by deforestation for maize plantation (bottom). The coloured dots on the picture are bags containing collected maize

fertiliser bag or a basket for collecting the picked maize cob – with husks still intact. The ‘pickers’ followed the same direction up or down the hill, depending on the host’s instruction. There were also ‘carriers’ whose function was to take all the cobs to the homestead. After we had lunch, we sat in a circle with the maize cob in the middle. Each was given a small knife for peeling off the husks. By almost 5pm, we finally finished the job. The host treated us with grilled catfish and rice whisky as usual.

In early January, I also joined Lai's maize harvest. Everyone complained that the weather on the day was exceptionally hot and dry, unlike the usual January weather. By 11am, I almost fainted due to the heat. The temperature must have been around 30 degrees, in contrast to the morning temperature, which was below 15 degrees. During our conversations, one sentence came up and got me to reflect on how others saw me. One person said, '*Ajarn* [Chaya] has come to observe *kon tuk*'. The word *kon* means person or people, *tuk* or '*dukkha*' in Pali language, and in Buddhist terminology, means destitution or 'troubled life'. They saw themselves as poor people who struggle in their life, while I was seen as an outsider who was better off in all aspects. I reassured them that I was there to learn more about their lives. People's struggles are described in more detail in Chapter 6, Section 6.2.

In the first week of January 2014, Rin took me to participate in a provincial-level dam building and tree-planting project²⁴. The Provincial Governor declared this project as part of the Nan people's fight against the 'barren mountain' caused by deforestation for maize plantation (see Figure 5.8). Rin often spoke of her antagonism towards maize planters and how she, as a Nan person, was generalised as a forest destroyer by outsiders, when she, on the other hand, was trying to stop such problems from spreading in her village. Rin and Sai were slightly disappointed that I joined the maize harvesting with certain families²⁵. I learned at the time that as much as I was studying other people, I was also being studied, such as how I ate, my marital status and whom I talked to (Niti 2012, p.192).

On the 10th of January, the weather news announced a further temperature drop of about 4-5 degrees. In the morning, when I went out to take pictures, the entire rice field was covered with fog, and the tree leaves were full of dewdrops. During morning and night-time, the temperature fell below 10 degrees, and of course without a heater, I had to wear at least two layers of clothes with a jacket, trousers, socks and beanie hat. My cement-built house was extra cold, while other villagers felt warm in their semi-wooden

²⁴ The project aimed to build a 500m-long check dam along the mountainous Yao river in order to slow down flash floods in the early monsoon season. Jai also introduced me to the Provincial Governor and other governmental and academic personnel.

²⁵ A member of Lai's family was later arrested because their maize was illegally planted on land with no owner. Rin was afraid that I too would get into trouble due to my association with the Lai family.

houses. Many houses did not have hot water, including mine²⁶, so that showering was painfully cold. Due to the housing infrastructure and the absence of traditional charcoal stoves for cooking (which generated heat), I might have perceived that winter as colder than other villagers did.

A few other activities were going on and off the fields during January. Jee and Kob, the wife and husband respectively, were adding fertiliser to tobacco. Jee said that it was so hot that I had better go find some shade to rest in while she would continue to work. This was not the first time someone had said this kind of thing to me. It was well meant, a sign that they cared for me and that they were aware that as someone who usually worked in an office, I was not acclimatized to outdoor weather. In the first morning of February, I met Mali while she was carrying out her chores on her mung bean field²⁷. She said to me ‘see, if you have a good job, you wouldn’t have to be *‘tuk’* like us farmers’. Both Jee and Mali saw education as key for life opportunities. Their children and relatives were encouraged to gain higher education qualifications. In the same day, I also helped transplant young rice on Lai and Kan’s field²⁸, and helped Sai and Rin to prepare their land for rice planting²⁹.

²⁶ Water usually comes from the village water tank which is heated up during the day time. So, most people have relatively ‘warm’ showers. Unfortunately, water in my house came from an underground pipeline which was always really cold.

²⁷ She had already sowed the mung bean seed in January and today she started to let some irrigation water in. She checked that all the waterways were connected and that there was no blockage. I walked with her as she ploughed the soil and removed some rocks.

²⁸ After talking with Mali, I went further to help on Kan and Lai’s rice field. Since late December, I watched their young rice trees grow and today they were about 15cm high with bright green colour, ready to be replanted on the paddy field. These young rice were removed from the ground, with roots intact, and were tied into a bunch, while the planting bed was remoulded into a flat paddy field fully submerged in water.

To plant, each farmer would hold the rice bunch in one hand, while grabbing about 2-4 young rice at a time with the other hand and sticking them into the muddy soil. There was no strict rule about the spacing between each ‘line’ as different families had their own style, but they were usually about 15cm apart. Everybody would stand in the same line and work their way backwards or forwards. I was fortunate to get onto the field in time while about 10 other farmers had already started work. It was my first time to do this and it was a very nerve wracking and discomforting experience.

The ‘single line’ planting was difficult because I had to make sure that my line was straight, that the spacing was correct, and that others could work their lines after mine. While certain farmer’s line spacing was jokingly judged, they were not as serious about the beauty as I was. The rest of the group planted young rice in with confidence through years of experience, but mine was with fear. The session only lasted about 40 minute.

²⁹ I went with Rin and Sai to another rice field. The rice field was located on the eastern edge of the main rice field. This afternoon Sai was helping Rin to prepare land for machine ploughing on the next day. I offered to help digging waterways to let irrigation water into her field, just like how Mali did with her

Photo-elicitation 1: November 2013 to February 2014

After about three months of living in Village M, I decided it was time to try out my photo-elicitation method. I went to Nan city and had my photos printed and sorted according to activities. In early February, I showed the photographs to Pang Gik, Jan, Wan, Min Mali, and Rin to see how they responded. In general, they were happy to see photos of themselves and friends and they tried to spot who was or wasn't in the frame. The only words they spoke were things like 'oh this one looks beautiful' or 'oh look at he/she in the photo'. It was quite difficult to stimulate them to express their reasons for liking a photo, let alone to reflect on the emotions and feelings associated with them. Harper suggested that it was because the photographs 'did not break the frame of the farmers' normal views' (Harper 2002, p.20), and that using aerial and historical photographs, and/or those of unusual angles might be more fruitful (ibid. p. 21). In addition, in my case, perhaps the large number of photographs (more than 30) did not help the farmers to focus.

I tried again with Kan on the next day and with Kob and Jee a week later, with fewer photos so that they could focus more. I also specifically chose pictures in which the participants themselves were captured so that they could talk more about themselves. The response improved, but overall it was not very satisfactory. For subsequent elicitation, I needed to shoot photographs from different angles.

The City-Rural Lifestyle Gap

February became suddenly warm. But for me, showering was still a thrilling experience. Morning fog dissipated faster but the haze pollution seemed to get worse, evidenced by the blurry mountains in the background (see Figure 5.9 left and right). Some odd rain showers helped to lower the temperature, interrupting the dryness and clearing the skies.

mung bean. It wasn't easy and it wasn't a brilliant job. The two ladies were glad that I experienced the hardship.



Figure 5. 9 Main rice field. On 28th February 2014, the mountains could barely be seen due to haze pollution (top); On 4th June 2014, the mountains could be seen again after rain and wind had washed away the pollution (bottom).

During lunchtime on a hot day in late February, I was talking to a food stall owner, Mali, about the past exceptionally cold winter. She said to me, knowing that I was from Chiang Mai, that ‘Chiang Mai people don’t know what cold weather is because they wake up late and they go to offices’. Here, farmers usually woke up very early and were able to experience colder weather and for a longer number of hours. Did it mean that I, as an urban person, could never experience authentic Nan weather?³⁰ (See Chapter 7 Section 7.1).

Since New Year, the first cultural event in Village 5 was tree ordination³¹, a re-invention of the Buddhist-Brahma-animist ceremony for worshipping the forest spirits and protecting the forests (Darlington 2003)³². I learned from Jan that apart from mountain spirits, there was also the goddess Toranee, or ‘mother earth’ (Davis 1984)³³. Coming from Chiang Mai, I was asked by the elders whether I knew and worshipped goddess Toranee. I said with honesty that I respected her but did not strictly worship her. They could also see from my conduct and behaviour that I did not have the fullest knowledge of the local social rules of conduct. Jan was not surprised given that I was from an urban area. ‘It was left only for rural villagers’, said Jan³⁴. This highlights the difference between the villagers and I in terms of cultural beliefs and the rural-city lifestyle gap.

³⁰ With this generalisation Mali was implying that I too as a city boy, living a city lifestyle could never really know what true Nan weather is, and that I could mimic farmer practices but would never become one. My one year in Nan was also only a temporary interruption in my Chiang Mai and UK weather experience. The implication was also that farming is probably one of the very few occupations that is truly exposed to the rawness of weather in all seasons. In Hitching’s (2010) work, UK office workers were insulated from the outdoor weather, and knew their weather from more or less sociocultural and technical indicators, rather than natural indicators or through visceral experience.

³¹ Since 2008, each village in Maung Chang was assigned to conduct a formal annual cultural event to preserve the local culture. These were, for example, worshipping the water goddess (November), village blessing (April), rice blessing (January).

³² Local monks and Jan prayed and chanted to the spirits to ask forgiveness for human sins and ask for peace and prosperity. The monk’s yellow robes were cut into pieces and were handed to each villager who would wander into the forest and tie the piece of cloth around large trees. This symbolized that the trees were blessed and deforesters would be cursed by forest spirits

³³ She exists everywhere and people worship and ask her for peace and safety, success, prosperity and protection against calamity in almost any activity related to soil or earth. This includes travelling, building a new house, and planting and harvesting. If their prayers are answered well, they come back to thank the goddess again with offerings.

³⁴ As well as worshipping Toranee, there are things people should and should not do on certain ‘Good’ and ‘Bad’ days (auspicious/inauspicious). These and many other, are referred to as ‘*keud*’ or cultural rules of conduct (Davis 1984).

Fruit Orchard and Farmer's Expectation

It was at the end of January that I started to recognise the vastness of Village M's fruit orchards. Pree claimed that he was the first person to introduce the 'kom' lychee variety from central Thailand into Village M in 1975. Lychee trees are usually planted extensively on hill slopes³⁵, entirely dependent on rain in March and April. More importantly, lychee and longan tend to bear more fruit in colder temperatures, and 2014 witnessed an exceptionally cold winter. The following are samples of different types of fruit orchards that experienced the same weather with different levels of expectations and results. I first visited Kob's hill lychee orchard at the end of February³⁶. Kob was astonished by the exceptionally high flowering rate compared to previous years, when only half of all the trees flowered. He attributed the flowering rate to the cold spell. In early March, I visited Nam's flatland lychee orchard next to a village creek. The water source was the key factor in her and her husband's good reputation for producing the highest quality of lychee in Muang Chang³⁷. While the cold spell was beneficial for lychee flowering and for mango, Mali complained that the latter did not bear as much fruit as she expected³⁸. The cold winter didn't help Sai's 130 mango trees either. Due to repeated drought and disease, they did not generate enough yield or profit. Nevertheless, Sai's lychee, generated far more fruits in 2014 than in previous years.

Interview with Local Authorities

After February, I started to contact government officials in relation to the issue of global warming and climate-change, as part of my Research Question 3. I visited Nan Meteorological Centre and informally interviewed the head of the Centre, and

³⁵ The advantage of hill orchards however, was that the colour of lychee would be bright red, which looks tastier for consumers. What is more, they bear fruit earlier than riverside lychee orchards, which means farmers can sell them and get revenue from them earlier.

³⁶ Kob was known as one of the biggest lychee producers in the village, owning over 300 lychee trees.

³⁷ She knew all of her 60 lychee trees intimately, pointing out their characteristics to me and their growth over years as if they were her children. I felt the love and care that she put into her work. It was on this occasion that I was able to go for a long walk with her around her orchard, taking photographs and making notes about the deep conversation we were having.

³⁸ She said that she rarely watered her mango trees, instead, leaving them exposed to the natural weather. A long time ago she had carried out an experiment by comparing the quality of mango with and without watering. She had concluded that the quality was very similar and that it wasn't worth making any extra effort. On that day, she wore full protective clothing: motorcycle helmet, mouth mask, gloves, and several layers of clothes, as she had to spray her trees with fertiliser and chemical to protect them against various plant diseases.

interviewed officers from Nan Municipality and Nan's Office of Natural Resource and Environmental Planning. Details of these activities are in Chapter 8.

5.3 Summer

My thermometer recorded morning temperatures at the beginning of March, somewhere between 17-21 degrees, unusually low figures due to a few showers several days earlier. Strangely, for this period, my neighbours were still wearing jackets, including me. March should be warmer (see Figure 5.4). In this period, agricultural activities started to wind down and people engaged more in social activities and cultural festivals such as village fishing, spiritual renewal ceremonies³⁹, and Songkran Day, the traditional Thai New Year. The first storm arrived on 24th of March, at about 2 a.m., ending the prolonged dry period. The wind was so strong that it slammed my window many times and woke me up. By late March, the heat intensified. The thermometer recorded significantly high night-time temperatures of almost 30 degrees. At the start of April, more storms came and persisted for several days. There were also thunderstorms and lightning, and the temperature decreased temporarily. The weather became much more humid, the haze cleared, and I could see the mountains again.

Renewed Relationship

The northern Thai New Year's Day, or what the locals called Songkran Day (Davis 1984), is between 12th -15th April. For tourists and teenagers, this is a water throwing festival. For the village elders here, this was a time for family reunions. One of the most important practices is for younger people to pay respect to the elders, known as 'Dum Hua', or 'soaking the (junior's) head with water', which I participated in⁴⁰, on the

³⁹ During the first weekend of March, Village 5 held a fishing festival at the village's public lake. It was a very lively event, with many people swimming and boating in and on the lake. Many people told me stories about the lake and the fluctuating levels of water over the years.

A few days later, on 13th March, marking one month before the Lanna New Year, the village held a village blessing ceremony (Sueb Chata Moo Bann). This was an occasion to renew the spirits and prolong the life of villagers, and of the village, and wash away any evil spirits in the village by tying holy cotton thread around the village (Davis 1984) Everyone gathered in the temple where the monk was chanting prayers. The long piece of holy white cotton thread hanging from the ceiling was tied loosely on everyone's head, symbolising the purification process. The holy thread was also tied all around the village via electricity poles to protect the village from malevolent forces.

⁴⁰ Villagers gathered in the village meeting hall and tables were setup for the 20 or so elders to sit down. Each young villager (anyone below 45) held a cup containing the holy water (water mixed with flowers and pods of a variety of acacia tree), and knelt before the elderly to pay their respects and apologise for any bad things they had conducted. The elders took flowers from the cup, and used them to gently

morning of Saturday the 12th April (see Figure 5.10). I knelt before many well-respected elders, including Mali, Dang, Mek, Pon, and Dee, paid respect to them and received blessings. Six months into my research, this day marked a renewal and tightening of my relationship with the villagers. In that moment of being touched on my head and receiving their blessing, and exchanging a smile at one another, it seemed to me that the boundary between the researcher and the researched, the outsider and insider, became blurred, even if temporarily. It was a symbol that I was fully accepted and treated as a son or a nephew in the village. Participation in a collective event, whether a joyful or painful one, often helps the researcher to bond with the locals (Geertz 1973).



Figure 5. 10 Dum Hua (soaking the head with water) during Songkran Day, 14th April 2014.

pat the foreheads of the villagers, blessing them for a good life. For the young, this was repeated to each village elder.

Harvesting 2: Soy bean, Fruits and Dry Season Rice

Agricultural work resumed in early April⁴¹. Rin and Mali started to harvest mung beans⁴² while lychee harvesting began at the end of April. I went to Kob's orchard to help with the lychee harvesting⁴³. Kob said that my fingers were for writing in the office, not for collecting lychee. As mentioned above, both Kob and Sai were very happy with their lychees. In 2014, all of Sai's 380 lychee trees bore fruit; normally only 2/3 of all trees did. Pree was also proud of his lychee, as he showed me around. He also said that he liked how I took note of everything so that I would have stories to tell my children about how I had wandered through this land of Muang Chang (similar to what Kan and Lai said). He and his fellow villagers felt very proud to be part of my life journey and my research. I too was glad to be part of their life. As Atkinson has stated (1998), the growth of relationship is as important as the information collected from the participants.

For several days between the end of April and early May, there had been tropical cyclone warnings. The weather became very hot and humid at about 26 degrees. Saturday evening 3rd of May⁴⁴ saw the Provincial Governor attending to open the Lychee Festival⁴⁵, held in Village 5, honouring Muang Chang sub-district as the largest lychee producer. There was also a contest for the best lychee (taste, colour, shape)⁴⁶ and the winner was Nam, my neighbour.

Indeed, since the end of April onward, each day was a mix of very hot humid weather and evening convectional rainfall. The temperature rose to about 35 degrees and the

⁴¹ Rin was very busy with her sick pigs due to heat so she postponed the harvest to the third week of April, after Songkran Day. The beans could wait for her, she said.

⁴² Very similar method of harvesting to rice.

⁴³ Kob patrolled around his orchard to collect the ripe lychee in his baskets which were then transferred to the camp where his wife, Jee, and children stripped all the leaves off the branch and tied the lychee together in bunches. The lychees were trimmed to fit and fill a plastic crate 25 kg in weight, sold for just over 20 Baht per kg. In about one week, Kob's family sold about 2 tonnes of lychees.

⁴⁴ It also rained heavily on the day before the Lychee Festival, which was held at a local school, causing the ground to become very muddy.

⁴⁵ He encouraged the farmers to adopt the 'Smart Farmer' scheme and reduce reliability on food imports. In addition, this year the lychee farmers were facing a rapid price drop due to excess supply. Since the end of April, the price dropped from about 25 to 20 Baht in the second week. It then dropped further to just 6 Baht per kg. Despite this, they had to continue harvesting; some money was better than nothing.

⁴⁶ The contest was judged by the City Governor and Chief of Muang Chang sub-district.

sun was also too strong for bare skin, so I took to wearing full protection⁴⁷. In my room, I was shirtless as the heat radiated from the cement walls and my two electric fans simply blew a warm breeze back to me. The loud call of the cicada was constant throughout the afternoon and evening. Dark clouds and heavy rain became normal every evening. But sometimes the wind was so strong, it blew the rainclouds away from Village M, so that we were never sure which way the weather would turn.

I spent two days harvesting Rin's dry season rice field; she told me I was the first doctoral student who had come to help people with the rice harvest. She was proud of her rice field and of her village. She also said that people liked to be photographed, and that they rarely got this opportunity. In this sense, photographs became tools that gave the opportunity to the subject, not the researcher, to speak (Harper 2002; Spencer 2011). After Rin's rice was harvested, I went back again to observe the field. To me, it was no longer empty but instead, was full of embodied memories. Rin's and my footprints were left on the dried mud, symbolising the recurrence of the histories of the land itself and of ours that intertwined there and accumulated over a lifetime (Ingold 2000).

After the lychee harvest was finished, farmers continued to harvest longan and mango⁴⁸. The temperature in June was dampened by a few rainy days and cloudy sky. As with rice, the villagers also gave me about 3kg of their best fruit⁴⁹ as non-commodity gift (Crouch 2003). I truly appreciated this mutual relationship.

Photo-elicitation 2: March to June 2014

The second phase of the method was conducted in early June, which was mostly about fruit harvesting. I learned that I needed to use only a few photographs from interesting angles, tailoring them to the participants. Unlike on previous occasions, with Pang, Jan, Wan and others family members, the photographs generated extended conversations. With Mali and her family, however, the method was still unsuccessful. I hypothesised that it could be due to her shyness. Sai, on the other hand, had a lot to say about the

⁴⁷ I could feel my skin burning as I walked. Hence I needed long sleeved shirt, trousers, socks, gloves, large hat and another piece of cloth to wrap around my face.

⁴⁸ On the first of June I helped Mek and his neighbours to harvest mango.

⁴⁹ In total, I was given so much, I had to post some back to Chiang Mai a few times.

photos, and the conversations, shown in Chapter 6, Section 6.1.3, were as a result, more elaborate and in depth.

5.4 Rainy season

Since late May, I noticed Nam taking down the clothes drying rack from her garden and starting to hang clothes underneath her roof instead. This signalled the coming of morning rain. But by the start of June, an important time for planting, the rain had not come, and people started to worry about their maize and rice.

Wet Season Rice Planting

The Thai Meteorological Department announced a potential development of storms in the second week of June. Based on this, the village committee decided that the rice planting date would be on Saturday the 14th June⁵⁰. On this day, the rice field was full of people sowing rice seeds on the soil and it looked livelier than ever before⁵¹. It would take until October for the rice to start to become ‘pregnant’. In the meantime, the paddy field was occasionally flooded using irrigation water (in addition to rainwater). It should be noted that not all villages decided on the same planting date, perhaps due to growth duration as well as physical limitations. In some rice fields in a neighbouring village, farmers sowed rice seeds as late as mid-July because of low soil fertility and lack of irrigation water in the area, which meant that farmers had to wait for weeks of natural rain before the soil was saturated enough for planting.

⁵⁰ Several days prior to this date, the villagers had gathered to clear up the overgrown scrubs along dirt tracks, irrigation channel and in the fields. This practice was called ‘long muang’ or ‘making water channel’, a preparation and signal for planting season. All the rice farmers gathered around on Thursday morning to slash all the scrubs along and in track and irrigation channels, and burned them. There was smoke everywhere.

⁵¹ In each field, the owners and their families carried bags of rice seeds and a long wooden rod of about 1.8m long. This rod was used to tamp on the soil to cause a dent of around 3cm in depth, and about 15 dry rice seeds was added to each hole. The spacing of each hole was about 10cm. An experienced farmer like Rin could make the holes really fast with precision.

As a novice, I lacked both power and precision, so in the end I was given the task of adding the rice seeds instead. These holes are for the rice nursery, with the same purpose and outcome as Kan and Lai’s activity in December, though the latter’s method was sowing seeds on slot soil, not in holes. Each family has their own favourite rice variety, but usually RD6 was a staple. Once the young rice reaches about 15-20cm, they are removed from the soil, and replanted using the ‘single line’ technique as described previously for Kan and Lai’s paddy field.

The planting season was an opportunity for students from Joko's Farmer Field School to experiment with new rice varieties, as well as trying new techniques or reviving old ones (see Chapter 6). Rin experimented with four different varieties; Po and Fa tried 'black rice' to be developed for commercial purposes; Mali planted a long forgotten local rice variety. Po and Fa also tried to revive a traditional planting technique, forgotten since 1986⁵². In another field, Moo prepared the land for a terraced rice field⁵³ and tied out his new local-made rice-sowing machine⁵⁴. While the farmer students of Village M were busy in their fields, they also made connections with students in other villages too, also within Joko's network⁵⁵.

As the rainy season progressed through July, the rice fields became wet and lively (see Figure 5.11). Birds could be seen looking for insects over the rice fields, and frog and toad calls could be heard clearly during the evening. These animals are associated with lushness and abundance. At the same time, the July and August monsoon rain was not as tame as that in of previous months. Since the second week of July, I witnessed very aggressive gusts, lightning, and thunder. The sky would go dark after 4pm and everyone rushed back home. Nobody wanted to be stranded in the open field, as they were afraid of the heavy rain and lightning. One night, lightning struck 5 times in 6 minutes followed by loud thunder like explosions in the sky; I never experienced anything like this before. And probably due to the unique architecture of my house (raised on cement stilts) it trembled so strongly after the thunder, it was as if an earthquake had struck. In

⁵² Instead of standing in the same line and sticking rice in the soil and working their way backwards, each person held their own line and walked forward 'around the clock'. The outer part of the field finished first, and then slowly worked toward the centre. Although once the rice trees were fully grown, nobody would notice what planting techniques the farmers had adopted, the memories were planted within each farmer, while the footprint was left as evidence.

⁵³ A terraced field which relies on slope angles transferring irrigation water and natural rain down to the fields. I observed how Mit and friends made and re-made their earthen waterways to control the water level that flows into their fields.

⁵⁴ The machine was made of roll-able plastic cylinder, a much cheaper but equally viable version of the imported steel machine. Using this method, it took 3 hrs to complete 1 rai with one worker, compared to 1 full day of work with several workers. On that morning with Mit and friends, it was cloudy and drizzled for the whole day, very similar to the typical British rainy day, and very unlike the usual monsoon rain.

⁵⁵ The school was in Pa Oi village, Santisuk sub-district, located over towards the mountains to the north. They wanted to learn about and share what other students were doing with rice this year. Upon arrival, they learned that the Pa Oi students had already used their sowing machines to plant rice and many students also made records of the planting date and rice variety they planted. More fascinatingly, they found that in uphill farms some farmers made a man-made pond with plastic lining underneath to reduce the risk of the soil cracking under the weight of the water. This was a new technique specifically designed for hillside fruit orchards that 5 farmers in my village were still seeking to learn.

August, the Nan River became dark red due to erosion, and there were news reports of severe flash floods costing lives and buildings in other districts. People watched from the bridge to see whether the river would flood its banks.



Figure 5. 11 A typical afternoon during the rainy season. Picture taken 30th July 2014.

After several storms, the temperature dropped to about 23-25 degrees, and on a bright sunny day the perfect bright green colour of the growing rice revealed itself in contrast with the clear blue sky, with dragonflies floating in between the two. But it was not long before more storms came. In September, northern Thailand was further hit by two typhoons.

Photo-elicitation 3: July to October 2014

Since the photo-elicitation procedure in the second session was relatively successful, I repeated it with the same group: Pang, Wan, Jan, Mali, Min, Kan, Sai, Rin. New faces included Nam and Nong, and Po and Fa. Sai further revealed her sadness about the sunset pictures (Chapter 6, Section 6.1.3), while Nam told me why her husband disliked winter season (Chapter 7, Section 7.1.1), and Po described the past farming life (Chapter 6, Section 6.2.2).

Recently Rin had bought a new mobile, and on a stormy day in August, she video recorded and narrated to her mobile phone how the rice tumbled in the storm. On another day, she narrated the movements of ants as they anticipated the coming rain. These were video recordings of less than 5 minutes long but they were far richer in detail and emotions than my photo-elicitation sessions, resembling de Vet's (2013) auto-ethnography method in her work in Australia, which I originally intended to try here. However, this was done during Rin's leisure time and it would have been hard to get other villagers to do the same.

5.5 Winter (2)

At the end of September, when the monsoon was over, people started to look for, and talk about, the coming of winter. The temperature was about 20 degrees and the wooden floor in my room felt cold. On one cloudy day in a restaurant, I overheard conversations about expectations of the 'cold wind'.

Lasting Relationships

5th of October was another important religious event for Lanna culture, 'tan guay slaag'⁵⁶. Sai and a few others believed that by going to Chae Haeng Temple and participating in this event with them, I would be able to re-join them again in our next lives. Indeed, over the months, I developed a very positive relationship with Sai. She was my good sister and she gave me insights about village life.

The Students and Ajarn

Since June, several undergraduate students from different universities arrived in Joko to gain work experience as part of their studies. Their presence led me to reflect on the relationships and power relations between the two contrasting titles of student and ajarn. I noticed that some villagers got very close to these students, evidenced by the kind of language they used, the teasing, the dirty jokes, and so on. The title ajarn implicitly forced people to respect me, and it partly created a behaviour barrier. I wondered: would I have been treated differently if I had been introduced to everyone as a student? Could I get closer to the villagers by just being a student, not ajarn?

⁵⁶ This was a large gathering of villagers in Nan's largest temple, Chae Hang Temple, to present offerings to monks just a few days before the end of Buddhist lent. This was considered a very auspicious occasion to gain merit for the next life.

Due to the gaps in age, life experiences, and backgrounds, I remained an outsider, but distantly respected. According to Chawla (2006) who conducted her ethnographic research in India, her home country, like me, she positioned herself as ‘a comfortable outsider/listener/researcher’ (Chawla 2006, pp.12–13), a person who the villagers considered ‘eligible’ to reflect on their lives, and a person with whom the villagers could openly reflect on their lives to.

Harvesting 3: Rice

By mid-October, the skyscape had not changed much from what it was in April and May; it was hazy and cloudy. The landscape, however, was much more lavish, full of greens which contrasted with the brown colours of the dry season. The temperature fluctuated between 23-28 degrees. In early November, there was also the odd rain shower, which was considered unusual. By mid-November, morning visibility dropped due to thick fog, and dewdrops could be heard clearly. A cold wind blew constantly during the day, and villagers started to wear jackets again.

At last, my final harvesting session came. It marked one year of my ethnographic research in Village M. I had slowly become more accustomed to the place, people, culture, and livelihoods. The villagers had also come to expect my help with the harvest and so expected me to participate in the harvest before I left, to see everything through and to celebrate with them. My involvement with the 2013 winter harvest could be considered as the get-acquainted phase, while the 2014 winter harvest was the post-survey phase (Fetterman 2010), more like a consolidation of friendship and confirmation of research questions and findings. This year I chose new places. In late October, I went maize harvesting with my neighbour Wai and her relatives. Most of the time, I questioned them about their opinions about the almanac to compare with previous findings (See Chapter 7, Section 7.1.4). When I told Sai that I had gone maize harvesting, she was quite shocked and surprised. Perhaps she didn’t expect me to support maize planters – I didn’t dare ask her why.

In the second week of November, the rice harvesting began. I went to Po and Fa’s fields where they had revived the old planting technique, and they convinced me to help out on Lek’s field the following day⁵⁷. Visiting Lek’s field was a phenomenal experience.

⁵⁷ I didn’t know Lek very well but I was told that Lek, a sixty-three year-old man, was an expert, though secretly, on growing rice. He rarely attended the farmer field school workshop, but had been secretly

Unlike any other fields, the height of the rice tree was always level and each plot was meticulously organised⁵⁸, showing his finesse and devotion to his rice. I should have got to know him earlier. I also helped Rin to harvest her rice that she had experimented with earlier on⁵⁹. By dusk, the harvest was done and we celebrated with Rin's grilled pork. That was when I saw everything through from the start, when in mid-June Rin had sown the rice seeds, to completion, where she carried the rice grains back home. This day also marked the completion of my major participation in the field, from 10th November 2013 to 17th November 2014. My last activity was to organise a focus group discussion (see below)

Interviews with organizations

The first sets of interviews were held at the end of October to early November 2014 in Bangkok with the Thai Environment Institute (TEI), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the Thai Meteorology Department (TMD) Climate Change Knowledge Management (CCKM), Mekong Adaptation and Resilience to Climate Change (MARCC), including two other academic researchers. The rest were Nan-based organisations, interviewed in different periods in 2014, comprising Agricultural Land Reform Office (Nan ALRO), Nan Meteorological Office (Nan TMD), Nan Municipality (Nan MUN), Nan Office of Natural Resource and Environment (Nan ONRE), Joko Learning Center (JK) and The Regional Community Forestry Training Center for Asia and the Pacific (RECOFIC). Details about these organisations are in Appendix E, and Chapter 8.

Prior to the interviews with the Bangkok-based organisations, I emailed to introduce myself as a PhD student at King's College and outlined my research aims, followed by a telephone to confirm the interview date, following Aberbach and Rockman (2002) and Hochschild (2009)'s recommendations on approaching elite and expert interviewees (see also Chapter 4, Section 4.2.5). All organizations welcomed the opportunity, understood my request to make an audio recording, and put me in touch with their research team to help answer my questions. With the Nan-based organisation,

honing his skills over decades, and his rice field, I was told, was one of the best-managed fields in the village.

⁵⁸ He manually selected his own rice seed and prevented contamination to ensure that all trees were identical in quality. He also owned a pond for water storage and fishing.

⁵⁹ On this field, Rin finally proved that organic fertiliser could improve yield; she gained three bags more of rice grain (about 110kg) than in the previous year.

I tended to conduct individual interviews, and slightly less formal ones as I already knew most of the people quite well.

Focus Group and Final Photo-elicitation

Due to limited success in the photo-elicitation method, I decided to arrange the final photo-elicitation session on 9th December 2014, this time together with a focus group in the village meeting hall. This neutral venue was chosen to ensure that participants felt comfortable (Crang & Cook 2007). The aim was to get them to talk about the weather and agricultural and social activities that had happened over the past 12 months in terms of their 1) feelings and emotions related to any events and in particular to weather conditions, and 2) identity of Muang Chang and their farming traditions. I arranged two sets of photographs: time-lapse photographs and village activities of Village M. For the first set, I selected about 2-3 photos of the same location to represent the changing physical characteristics of agricultural fields and skyline for each month (total 27). For the latter set, I also chose about 3-4 photos of any significant and relevant activities that occurred in each particular month (total 45). These photos, most of which many people had already seen, were arranged along the length of two blackboards. My attendees were eight females and two males, and a few others who joined for short periods. This mixture wasn't surprising (for this winter period) since most males were working in orchards, and females stayed at home. I also asked Ing from Joko to help steer my questions as she knew these villagers well and had experience in conducting focus groups. Her role was only to be a facilitator and to help reinterpreting my questions. The participants were informed about voice recording, and everybody gave permission for the focus group to take place.

First, I asked each person to choose and explain their favourite photos, which Ing and I then tried to link to research questions. In the end, I asked them, as a group, to choose 10 photos that best represented Village M and Muang Chang, and explain their reasons. It took almost 3 hours and overall, I was satisfied with the outcome. One great advantage was that the group helped to correct my misunderstanding, thereby enhancing the richness of the interview data, compared to smaller group or one-on-one photo elicitation method I had conducted previously. The more formal arrangement of chairs and the limited number of photos also helped them to focus and carefully explained their reasons more openly. However, I also noticed that a short visit by Pon, the former village headman, changed the dynamics of the discussion group. It was well

known among villagers that Pon had a good memory for weather, and he liked to show off his stories. His authority, strong character, and seniority dominated the session and other's voices were reduced to supportive roles. Ing and I tried to steer other villagers to talk more with limited success. Once Pon left, the group resumed its liveliness.

Leaving

One of the most touching and memorable aspects of this fieldwork was the relationships that were created and that endured. Similar to other 'native' ethnographers, the research helped me to discover more about my own cultural roots (Narayan 1993). During my last few days in the Village, I was given so many bags of rice⁶⁰. These were the most sincere gift that I could have ever received as they came to me through the sweat, care and patience of the givers. Sai also gave me a particular Buddhist prayer book, one that meant a lot to her⁶¹. Mali, held my unblemished 'office' hands with her callused ones and asked me to promise to return to the village. I assured everybody that I would go back. Although our relationship as researcher and researched has ended, our relationship as family endures (Paritta 2012, p.223).

5.6 What I Missed

Throughout my entire year of ethnographic research, there were a few things and places that I found relevant to my research questions but there were also certain inevitable barriers which I had to accept, or timings that were not right. I address them in turn below. First was Vej⁶², a man who claimed he was able to memorise rain frequency in each month, as well as the rain prediction from the almanac, and plant his crop

⁶⁰ For example, Po and Tood gave me a bag of rice in return for me joining them during their planting and harvesting.

⁶¹ Throughout our relationship she told me about her father who had passed away from cancer. At the moment of sunset, her father had stopped breathing but she kept on reading the Buddhist prayer to him. Every sunset reminded her of her father and grandparents who had passed away. On the day that I withdrew from the village, she gave the prayer book to me, and said that I should find time to read it. The book meant a lot to her and I felt very honoured that through giving me this book she wished to share a such a significant life event with me.

⁶² I knew him because he lived with his son who also ran a small bicycle garage at his house where I often fixed my bicycle tyre. He was about 65 year old, I never saw him in the field and so never really engaged him in any agriculture-related topics. It turned out that he was one of Po's brothers.

Vej told me that he used to be able to memorise rain frequency in each month, and compare this with the almanac readings. He also claimed that he was often the first person who went to the fields to start planting or sowing seeds according to his rain prediction. About 5 years ago, he had acute renal failure and a series of strokes which also erased most of his memories.

accordingly (see Chapter 7 Section 7.1.2 Knowing the Rain 2). Unfortunately, a series of strokes caused him to lose those precious memories. Another missing precious piece of weather information was from Pon. He told me that he used to keep records of rainy days in his diary. Unfortunately, he said that he couldn't find his diary anymore. He had thrown it away when he was cleaning his house. His diary would have been invaluable, as the only written record of local weather data. Still, his verbal accounts of Village M's weather were very useful.

During early November 2014, I read a tourism magazine in a coffee shop and found that there was a temple just outside of Nan city which had a Buddha statue for rain worshipping. I went to Paya Wat temple and learned that the rain worshipping ceremony was carried out during severe drought years, in which the Buddha statue would be carried to and 'showered' in the Nan River, symbolising the arrival of rain. For over twenty years there had been no ceremony because the statue became damaged⁶³. A young monk whom I talked to also claimed that people no longer believed in the miracle. During that period of time I was busy preparing for interviews with organizations in Bangkok, and hence didn't find time to visit the local people.

Another rain worshipping ceremony had been carried out in a neighbouring village to Village M. It was the 'cat parade' rite. But because this rite was not conducted by people of Village M, it was not mentioned until November 2014. Luckily, Sai, who was born in Village M but currently lived in the neighbouring village, was kind enough to tell me about the ceremony and sketched for me the atmosphere of the day. The rite is discussed in detail in Chapter 7, Section 7.2.2).

5.7 Summary

In this research, I chose to undertake ethnographic research in a village of Muang Chang sub-district, Phu Piang District, Nan province. Joko Learning Centre, a Muang Chang-based nongovernmental organisation was the gatekeeper, and through connection with the Chief of the Sub-district, Mr. Jai, and Min the village headman, I was given permission to study the farming livelihood in order to explore experiences of the weather throughout the entire year. Village M had a population of about 500 though

⁶³ Since the statue was about several hundred years old and made of wood, over years water damaged the statue, and so the villagers protected it by casting cement over. The statue became too heavy to be carried and henceforth remained in the temple, and the ceremony ceased.

only about 35 or so were chosen as participants. These were elderly, semi-commercial glutinous rice and fruit farmers.

Throughout my 12-month research, I personally witnessed and experienced, for the first time, changes in the landscape and skyline of this village, and of Nan province. On my arrival on 10th November 2013, the rice field was golden and ready to be harvested. I was surprised how warm it was for that period, but a month later the weather felt like ‘October in Belgium’, according to the Belgian visitor. After the odd December rain, the weather turned severely cold, definitely below 10 degrees, so that several thick layers of clothes were just not enough. The cold also generated an unexpectedly successful fruit flowering rate. March onwards saw rice fields turn brown and dry with the heat, while the haze pollution limited visibility of the mountains in the background. April and May brought thunderstorms and lightning to interrupt the dryness, but temperature was still high, around 35 degrees. Loud cicada calls permeated the soundscape. The rainy season was delayed by about almost three weeks, making farmers anxious about the crop. In July and August, there was thunder and lightning. By October, the temperature had fallen below 25 degrees. The sky was hazy and cloudy like in March, but the rice fields were by then a lush green and alive with numerous kinds of insects and animals. By mid-November 2014, morning visibility dropped due to thick fog, and cold breezes resumed. There was no sign that the 2014 winter was going to be as cold as the last one.

At Village M, I participated in various agricultural and socio-cultural activities with the villagers. The advantage of being ‘native’ was the assumed emotional and cultural connection with the villagers. But the bonding process was not easy. Yes, I grew up in northern Thailand, and so I have memories, assumptions and expectations about the Nan weather and livelihoods. However, as other native ethnographers have experienced, I started as an outsider trying to gain understanding of local lives, and could never have gained a wholly authentic or complete insider’s view (Chawla 2006; Narayan 1993). My multiplex identity (Narayan 1993), as a young, educated urbanite, with *ajarn* title, coming to observe the hardship of rural lives, and also as a cameraman, inevitably created certain behavioural and emotional barriers in the first few months. As much as I tried to study the local people, I was also being studied. They expected me to be able to speak the northern dialect, to understand the significance of the spirits and the ‘Auspicious’ and ‘Inauspicious’ days, but I did not perform well. Some farmers

also created a dichotomous narrative of ajarn-farmer, suggesting that I was out of place because of, for example, my inappropriate dress code, or my inability to completely understand what is a farmer's *tu* because I had never been a farmer or owned land or made decisions about what to plant.

I tried to break down these boundaries through observing and participating, through taking notes and photographs of farming activities, as well as attending religious ceremonies and cultural events like Songkran day. These actions helped me to gain legitimacy, as more than just another scientific rice researcher who came and only touched the surface of people's lives. My involvement with Village M and the knowledge gained came through a series of direct and indirect negotiations of power relations with the local people. Since Songkran Day, I gained trust and developed closer relationships with the villagers, and this developing relationship was evidenced by the fact that they expected me to help with the 2014 rice harvest, to see everything through and to celebrate with them before I left. I also noticed some of the narratives they constructed. At first, not surprisingly, it was about recommendation of things I should do, or encouragement to explore different people and places. At the end, especially with some of my key informants such as Po, Sai and Rin, it was more about politics, problems and the future of farmers, knowing that I had a connection with Jai, the Chief of Sub-district, and Ing from Joko. Because of trust, they also came to see me as a mediator between insiders and outsiders. Overall, I was respected by the villagers only as a 'partial insider' (Chawla 2006; Narayan 1993; Paritta 2012).

In terms of my method, the problem was mostly with the photographic method. My initial plan to use auto-ethnography (following de Vet 2013) failed, and so all photographs were taken by myself. These were used in a photo-elicitation process which didn't go well at first, but limiting the number of photos and tailoring them to specific participants helped to reveal emotions, feelings and memories better. Rin's video recording and self-narration also showed me the real potential of auto-ethnography. My last photo-elicitation session was combined with a focus group to get the 10 participants to talk about the weather, agricultural and social activities in terms of their feelings and emotions and place-identity. This last activity was very helpful as it gave me the opportunity to enrich and refine the knowledge I had gained.

By applying the concepts of place, dwelling and landscape, as argued in Chapter 2 and then in Chapters 6 and 7, Village M and its people, place and weather, were not objects

to be studied, but subjects that were constantly in the making. This chapter has shown that methodologically, this argument holds true (Country et al. 2015). I could not simply apply the theories of each method (Chapter 4) onto Village M and gain understanding. Rather, knowledge was gained by negotiating my body and subjectivity as well as my methodological and analytical processes with the subjective research participants and their places. As Narayan (1993) argues, there is a blurry line between the researcher and the researched, insider and outsider, and subjective knowledge and objective truth. The same argument applies to understanding the weather. In Chapters 6 and 7 I show that making sense of place and weather requires probing deeper into how body, emotions and place are interrelated, remembered and how they have transformed people's livelihood and practices.

Chapter 6: The Making of Muang Chang

In this chapter, which is the first of the three empirical data chapters, I present and analyse how Muang Chang and Village M are shaped by daily embodied practices and external flows and relations that penetrate these situated spaces. They follow the theoretical arguments presented in Chapter 2 that place is as an affordance and a spatial relation that is co-constitutive of livelihoods. Furthermore, it is the importance of local sites, such as the mundane fruit orchards and rice fields, as well as their human and nonhuman inhabitants, which have always been the ground for multidirectional place-making processes from within and outside the place. Section 6.1 primarily concerns the agrarian landscape of Muang Chang as home and taskscape. Section 6.2 shows how the exact same place was used for grassroots movements and resistance against negative representations from the outside. Finally, in Section 6.3, I conclude by arguing for the multiplicity of Muang Chang and Village M as places that are always becoming. This chapter also serves as a bridge between Chapter 5 and Chapters 7 and 8. While in Chapter 5, farmers' livelihoods are discussed in a linear temporal sense, this chapter sees the livelihoods rooted and routed with the agrarian landscape.

6.1 Place for Dwelling

The agriculture fields and orchards of Muang Chang, whether they are on flatland, riverside or on hills, come into being when they are dwelt in, that is, 'the rich intimate ongoing togetherness of beings and things which make up landscapes and places, and which bind together nature and culture over time' (Cloke & Jones 2001, p.651). In the following sub-sections, I show how farmers' daily and seasonal movements make the upland and lowland topographies their home. I also show the intimate and sensory experiences between humans and plants in the orchards and rice fields. Simply being in the orchards and rice fields also imparts spiritual and physical well-being, as well as providing a connection between past memories, the present and futures. In addition, cultural belief adds a sacred dimension to space where landscape, humans, nonhumans and spirits connect as one. As shown below, Muang Chang is more than simply a taskscape which binds diverse relations, and the past, present and futures to its locus.

6.1.1 Movements and Relations

People's movements in Village M correspond to the growth of plants, their seasons and topography. Every morning by 9 a.m., people set out on their westward journeys to begin their daily tasks in the fruit orchards (upland) and/or rice fields (lowland). A series of sounds of shouted greetings amidst the loud engine noise could be heard along the way. By late morning, by which time most people were on the hillside, Village M became silent, and remained so until just before dusk. These sounds of movements signify that Village M and its orchards and fields are alive and always in the making.

Ascending and descending the hilly topography of Muang Chang were daily routines, and the routes taken, as well as their relationships and networks, vary across seasons and times. From rainy season to winter, people are busy with rice and maize. Both these crops used to be grown for subsistence but now maize is commercialised. For the former crop, people's movements are concentrated in the main village rice field, and labour and relationships involve families and friends. Maize, in contrast, is grown upland, and under contract farming, with farmers linked to intermediary purchasers and the invisible force and networks of international corporates. About a century ago, rice too was farmed upland, but has since been replaced by fruit orchards (lychee, longan and mango). During the fruit season, between summer and the rainy season, farmers' movements are concentrated in the hills. Fruits are sold to intermediary purchasers from northern, central and eastern Thailand. Daily and seasonally, the movements around the Village vary greatly, and so too do the network of interactions of each individual farmer.

The hilly geography of Muang Chang is known and made familiar by people's movements and desires to gain food security and continue farming. In contrast to their grandparent's generation, the place-making routines and the relationships between farmers, their networks and the crops have become more complex and extend outside Muang Chang and Village M's physical boundaries and these changes in agrarian lives and histories can be traced from the 'texture of landscapes' (Ingold 2000, p.150).

6.1.2 Sensory Experiences

While the landscapes of Village M become noisier and busier as paths and relations cross, what exactly happens in the orchards and fields? To explore further the situated and sensuous dimensions of these spaces (Lorimer 2006), plants need to be considered

as having agency. Plants afford humans to perceive and engage with them in the first place (Clope & Jones 2001). They animate people, and are in turn animated by the changing weather-world. For example, during a severe summer drought in 2014, Sai's mango trees were dying, and this made her feel lost and discouraged [Sai 1356]. In another case, during the rainy season, upon seeing her young rice grow beautifully in organic soil, Sai felt cheerful and inspired after her hard work [Sai 1889-90].

Some farmers, especially female ones, consider their fruits to be sentient or human-like. When rice is 'pregnant', it bows its head, becomes more rounded, and turns from green to golden [Rin 1475; Kan 1480]. Pruning lychee encourages growth of young branches and hence more fruit, equivalent to a young lady that could bear more children [Nam 1458]. Po once described a particular mango to be as beautiful as a 'Miss Thailand' beauty pageant [Po 1818]. Some female villagers admitted talking to their plant 'friends' daily [Mali, Fa, Mai, Tai F652-663]. Mai chatted with her luffa (*Luffa acutangula* (L.) Roxb.) because it felt lonely and was scared of ghosts [Mai F663]. These examples show that some villagers see plants as female companions. This maternal characteristic reinforces the notion that nature is the provider of life for humans (Davis 1984; Descola 2013; Ingold 2000), and in return, humans pay respect to nature (see Section 6.1.4).

With affectionate talking and sensual nurturing, humans and plants become one another (Clope & Jones 2001; Ingold 2000). Nam called her lychee trees her children [Nam 1033], and the growth of the latter was shaped by the former's agricultural knowledge picked up from workshops [Nam 1068]. Nam knew each and every tree personally. The colours, shapes and sizes of lychee were known through eyes that were attuned to the different hues and through fingers that felt the textures of the fruit, from flowering through to maturing and ripening, until they became known bodily and pre-consciously. In May 2014, during harvesting, Nam said that only lychee with yellowish red colour were ready to be harvested. While on a ladder, gathering the fruit, she said:

For an experienced person, there is no need to even look. See, just like this [pulling lychee from branches]. When it is ripe, the colour would be right. The fruit would be round. No need to look. I don't see why it is difficult

[Nam 1698].

Nam's precision and confidence were in sharp contrast to a worker she had hired (and myself) who had never harvested lychee before. The novice was always hesitant about which fruit to pick. Nam's story illustrates that such care, such tactile and intimate bonding between plants and human cannot be understood by gazing from a distance.

Fruits and trees come to be known through tiny actions, movements and growth that vary across seasons and over the years.

Orchards and their products are spaces where boundaries maintaining human relationships dissolve, too. Orchards can produce more fruit not only because of good weather, but also because of sharing the produce with others [Kob 1519; Nam 1685; Pang 2433]. For Sai, her orchards were for sharing, even with those who would take advantage of her [Sai 2719]. Fruits become objects for expressing kindness and their identity as home-grown products (Crouch 2003, p.23) that dissolve the boundary between ‘us’ and ‘them’. These acts of kindness turn orchards that are mere demarcations on a map as land plots into borderless, welcoming places.

6.1.3 Comfort, Memories and Nostalgia

By just being in the gardens, fields or orchards, the inhabitants of Village M derive feelings of comfort and peace, cut off from the world outside, in the ‘naturalistic’ mode of perception, which Stenner et al. (2012) refer to in their work on British gardeners. For farmers in Village M, they feel *sabai jai*, or relaxed, both physically and mentally. In her lychee orchard, Pree said to me:

Farming is fun. Living like an old person is to live with nature and feed pigs and chicken. Then go home. There is no need to think much. Sabai jai, no stress.
[Pree 1625].

Sai compared office work with farming in that the latter is more independent: ‘it’s not like punching the clock at offices...You are your own boss’. [Sai 621]. Yet, there are many invisible but powerful forces shaping their livelihoods (see Section 6.2).

The fields and orchards also act as a medium for connecting a lost past with the present and future. This ‘nostalgic’ mode of perception (Stenner et al. 2012) offers a space to remember and reflect on histories and relationships. For example, I showed Sai some photographs which depicted sunsets in July 2014, with the rice field in the foreground and mountains in the background. The photographs reminded her of lost grandparents and a father who had always encouraged her to plant and protect trees.

This time of the day was when my granddad and grandma sat down and told me stories about our lives. They said, “whatever your father did, you have to follow his examples”. This is sad, you know?
[Sai 2620]

These photos, when I see them I feel downhearted, desolated and dismayed deep inside my heart.

[Sai 2627]

My feeling is that I don't want anything to happen here at all [fingers rubbing the darkening mountain in the photograph]. It's depressing especially when trees are not visible. It's discouraging.

[Sai 2628]

Every sunset constantly reminded Sai of the current issue of deforestation, and the teachings of her grandparents and father have always been a powerful motivation for her to become a sustainable farmer and continue the fight against deforestation.

In other stories, less personal but shared among the villagers, there was nostalgia for, for example, *tob* mushroom (*Astraeus hygrometricus*) [F275-300], buffalos [Dam 722; Mek 812; Wai 2274; Mali 2828], and chemical-free rivers [Rin 2036], which came to symbolise a lost past of bountiful nature that were part and parcel of a traditional subsistence livelihood. In other words, farming livelihoods in the present, increasingly materialised and mechanised, are negatively compared to the past. Interestingly, these adverse changes could also be linked and explained by changes in climate. The linkages between changes in society, and 'appropriateness' of weather and climate are explored further in Chapter 7, Section 7.2.

6.1.4 Cultural Belief and Rites

It should be noted that Muang Chang's landscapes are not only known bodily, sensually, viscerally, and retrospectively, but also culturally. Based on a concept of polarized but interrelated 'highs' and 'lows', the Muang belief (Davis 1984) determines a human relationship with, and responsibility to, nature (see Chapter 3). There are places and things which are considered auspicious, such as rice fields and rice grain, and they are blessed by powerful guardian spirits, for example, Toranee (the Earth Goddess) and Lady Kosok (the Rice Goddess) (Davis 1984; Stott 1991; see also Chapter 7, Section 7.2) (Therefore, for villagers to be planting rice is to be engaging in auspicious and sacred practices. And because humans are always less powerful than spirits, the former must respect the latter and be wary of the moral consequences of inappropriate behaviour. These concepts are applied to all daily life practices, for example rice harvesting and planting.

During the first planting ceremony, Hawk's eye talisman and cotton thread are used to wrap around land plots to (symbolically) protect the rice (noble, inside) from intrusion

of animals (unrefined, outside) (Davis 1984, p.164). This does not mean that certain kinds of objects and beings are outside of the human world. Rather, by believing, worshipping, chanting, and performing using relics and artefacts, the inhabitants of the landscape are understood to be interrelated but in a relatively auspicious and sacred order. The rites that people participate in allow them to see beyond the texture of surfaces, and into the intrinsic qualities of the physical natures that are animated by spirits in the background. The same concept can be seen in the rites conducted during rice harvesting. Muang people believe that all humans, plants and animals are made up of body and soul/psychic energy (*kwan*) (Davis 1984). During the entire course of rice growing, farmers may have maltreated or disrespected the rice, and may have startled the rice *kwan* away. The farmers then have to pay respect to Lady Kosok, the rice goddess, and make offerings to invite *kwan* back into the rice granary of each house after rice is harvested (Davis 1984, p.237). Offerings (banana and cooked rice) are also made to Toranee to give thanks for clement weather and prosperous productivity [Mek 822; Nat 1789]. In sum, people's good and bad deeds (towards the physical manifestation of nature) are always being judged by the spirits and celestial beings.

Rice growing is materially rewarding and spiritually sacred. The practice and the rites associated with rice growing bind human and nonhumans together, blurring the cultural and natural divide. Muang beliefs reflect the farmers' deep gratitude towards rice, hence the treatment of rice as another human being. In an agrarian landscape like Muang Chang, humans and nonhumans co-habit in and off the fields, in the bodies and in the minds throughout the seasons. The Muang culture not only exemplifies the interrelated nature-culture relationship (Davis 1984), but also dictates the roles of humans in the cosmos – to have moral responsibility to their 'home' and to their sources of life.

6.1.5 Taskscape

In his analysis of the painting 'The Harvesters', Ingold (2000, p.201–208) described how in every crop cycle, whether in spring or summer, the wheat harvesters who were engaged in many different kinds of activities, were brought into the same temporal presence of the plants and their growth. Relationships between plant and human are forged along the journeys to and from the sites, and in the micro geographies of a site. Trees are not only the locus of tactile and affective engagement with the present, but also encompass the histories, memories, and futures of humans, topographies and atmosphere into their places (Ingold 2000; Lorimer 2006). In this field- or orchard-as-

taskscape (Cloke & Jones 2001; Stenner et al. 2012), the plant-human-weather-land relations are formed in, and emerge from mundane actions, be they going up and down the hills and valleys, chatting with the plants, performing a rhythmic harvesting dance, or making the fields sacred. Over the cycles of seasons, time and place, the villagers of Village M and their crops and animals co-constitute and co-transform in an endless continuity. The act of dwelling by both past and current generations of farmers inscribes the agrarian landscape of Muang Chang with texture, life and emotion. These embodied cultural resources are left on the land for ‘the future generation to go further’ (Ingold 2000, p.189).

6.2 Flows and Relations

Through inhabiting the fields and orchards, the villagers constantly make and re-make the landscape on a daily and seasonal basis. Nevertheless, this is not the only dimension of the place-making and meaning-making process. As Cloke and Jones (2001) describe, whilst engaged in the rice fields and fruit orchards, many imaginative constructions are played out, including those of plants, knowledges and livelihoods, Muang Chang-Nan-Thailand identities, the market and consumers and agriculture guidelines, policies and politics, and so on. In other words, Muang Chang and its ‘*orchardness*’ (Cloke & Jones 2001, p.658) and hence ‘*riceness*’, ‘*lycheeness*’ and so on, are differently imagined and practiced by insiders and outsiders with different goals, ontologies and ways of interacting with the place. Below I describe the visions that outsiders have created of Muang Chang and Village M, and how the locals have tried to conform to or resist such representations using their own embodied practices.

The following five issues are only a sample of the multifaceted struggles in the farmers’ daily livelihoods. These struggles are what the villagers referred to as *tuk* (destitution) or *kon tuk* (person in destitution/troubled life) (see Chapter 5, Section 5.2). I asked Jai, the Chief of Muang Chang sub-district, what else farmers had to fight apart from the weather. More specifically, I asked whether the famous idiom ‘backs fight the sky, faces fight the earth’ (see Chapter 7, Section 7.2.2) was applicable in the present. Jai replied that there were many other invisible forces that people struggled with. The following quote powerfully captures what they were facing:

...[Fighting against] the sky and the earth are what they do during the daytime. But while they were lying down at night thinking about tomorrow, they had to fight against some sorts of institutions that really crush their hearts...they had to deal with contracts, and so many things like debt from Bank for Agriculture and Agricultural Cooperatives and local lenders. Or even their neighbours...

...there are many more than just the sky and earth. 'What am I gonna get tomorrow?' and the children called for more money transferred into their accounts. It's time for tuition and accommodation fees. And they [children] really force us...

...a fight against some large unknown things. Our rights that were taken away...the rights to plant certain tree species. The 15 items in the list...And same for the seeds. The seeds that we grow by ourselves, hey, why are they similar to the ones from the firm? I bred them myself. I'm fighting against invisible hands. Individuals that become powerful transnational companies. They have the rights over the sovereignty of the owners of each rice field. My sovereignty! It's dispossessed. I don't know who I'm fighting against...

...[The case of] mango years ago is clear. Muang Chang people have to grow them for those outside. If we don't do it well, they won't give money in exchange. What are we fighting against? Is it our greed? Fighting against something that has certain standards. They give us the standards that we then have to fight for...

The current farmers are not just fighting against the sky and the earth. They have to fight against everything...

[Jai, interview]

6.2.1 Rice, Fields and Farmers: Two Different Perspectives

Today, Nan remains one of the poorest provinces in Thailand (UNDP 2010). Poverty is in everyone's memories. For example, Wai recalled that during the major 1963 flood, there was still no electricity [F236]. Even 30 years ago, the 'Red' (communist) village was 'wild, dangerous and full of tanks and tigers' [Sai 2631]. Poverty is partly a result of Nan's physical, social and political marginality, which, in the 1970s, had also given rise to the communist forces being joined by upland ethnic minority groups (Rossi 2012, p.278). To intervene, the then Thai military government introduced the Green Revolution as 'the condition of economic progress' (Santasombat 2008, p.41), with hidden security and centralisation agendas (Rossi 2012, p.278). In Village M, electricity, the canal, bridge and school were built as late as 1980s with help from the military [Sai 1567].

But with development programmes, Nan, local people and natural resources have been objectified, commodified and controlled (Santasombat 2008, p.41). Fields and orchards have been reduced to sites of capital-labour and production-consumption relations, and

local knowledges and cultures devalued (Santasombat 2008, p.41). ‘They only use pens and mouths, but never come in to observe closely’, said Rin [1012]. Rin and Dee complained that officers of the Nan Agriculture and Land Reform Office (Nan ALRO, see Chapter 8) were not interested in the meticulous and bodily efforts and struggles that went into producing rice [Rin and Dee 271-276]. The state has failed to recognise human dignity and the imaginative world (Anan 2012, p.68). These are simply immeasurable and hence unaccounted for in government reports. Instead, officers only want to know the number of sacks each farmer produces annually to compare with the average value estimated by central government.

In contrast, villagers of Muang Chang do not see their ‘places’ as sites of agricultural production (Santasombat 2008), but, for as long as they can remember, as living spaces for dwelling in and for cultivation, as described in Section 6.2. For these subsistence rice farmers, rice and rice farming means something deeper than the number of sacks produced. They were symbols of individual and community roots, skills and pride; as Kan said: ‘rice is the number one necessity. If you run out of money, that’s fine. But running out of rice, that is shameful’ [Kan 391]. Rice farming is also strongly linked to feelings of frugality, independence and (food) security. As Rin explained:

Rice, if I have it then there is nothing else to worry about. We can always find food dishes. But without rice, it’s bad. If there is no food, just sprinkle some salt on rice is still alright. My mother used to do that

[Rin 197]

More broadly, the villagers do not want to be seen as poor, and the likes of Nam [1463], Nong [1045], Tae and Dam [715-728], Wai [F523], and Mali [1418] advertised themselves as those who continued to inherit traditional agriculture knowledge amidst modernity, following Thailand’s King Bhumibol’s concept of sufficiency economy⁶⁴. They wanted to demonstrate that they relied on diversified sources of income [Rin F792], and their village operated according to ‘the common rules that everyone

⁶⁴ King Bhumibol’s sufficiency economy is normative and ethical values based on concept of moderation, contentment and sufficiency. This is deeply connected with images of pre-commercialisation of Thai agriculture (Dayley 2011). Following the study of Rossi (2012) in Nan province, supporters and opponents of sufficiency economy were strongly related to political parties, the conservative (‘Yellow’) and the reformist (‘Red’) parties, respectively. In addition, there were generally more ‘Red’ supporters than ‘Yellow’ supporters in Nan. It was unknown, and beyond the scope of the study, whether the villagers’ alignment with the King’s sufficiency economy were their genuine thoughts, or because they wanted to show to *me*, an outsider, that they supported the King, and be considered as the ‘good’ Thai citizen. The former case would be they were genuine ‘Yellow’ supporters; the latter were pretending to be ‘Yellow’ supporters. Linking to Chapter 5, I was put to the ‘front stage’ i.e. the words I heard were ‘provisional truth’ (Berreman 1962).

respected...solidarity, fairness and equity' [Rak F785]. This was, in part, to counter the image of backward and unruly swidden cultivators that the state has portrayed (Forsyth & Walker 2008; Santasombat 2008), and an invitation to outsiders to understand the multiple and complex forms of rights and rules that operate within a single village that the state often ignores (Anan 2012, p.56). These examples show contrasting ontologies and epistemologies of rice production between the government and farmers. Similar quantification of natural resources in conflict with local knowledge and practices such as forest resource management can be found in the works of Darlington (2003) and Forsyth and Walker (2008).

6.2.2 Experimenting and Reviving Farming Knowledge

As a response to the government and corporate's domination of seed management, as well as to the perceived changes in climate, about ten villagers joined a local NGO Joko (with support from Nan ALRO)'s Farmer School programme, declaring their willingness to adopt organic farming and their desire to demonstrate the ingenuity of traditional knowledge. The rationale of this project is described in Chapter 3, Section 3.3.3. Following advice from an officer, Rin wanted to experiment, prove and convince fellow farmers that organic farming worked equally well or better than inorganic farming [Rin 276]. After the rice harvest in November 2014, she was able to produce three additional sacks of rice (110 kg) compared to previous years [Rin 3262]. After attending a workshop hosted by JK, Mali brought back seeds of a once-forgotten northern Thai rice variety, *Leung Hom*, and introduced them for the first time on Village M's soil. She was satisfied with her 'experiment' in terms of yield and taste, and aimed to breed this variety and share it with other farmers [Mali 845-848].

Po was keen on reviving and sharing traditional farming knowledge and practice [Po 2166]. In July 2014, his group applied the traditional 'round the clock' rice planting technique, and manually threshed the sheaves of rice. These slow and rhythmic, mind-body-plant-soil-sky binding movements were those that had been taught by ancestors who dwelled on the same piece of land, and the current farmers were now re-learning them in order to share knowledge with future generations. While these traditional subsistence farming techniques were cumbersome and time-consuming [Dam, 722; Pree 1623], farmers like Po and a few others, together with local authority officers like Jai and Ped, wanted to preserve them, and at the same time use machines where

appropriate to save labour. This benefitted aging farmers while attracting future young farmers to reconsider the adoption of certain agricultural traditions [Ped 2415].

6.2.3 Forest and Maize

Deforestation has become a serious issue in Nan province over the past two decades (see Chapter 3, Section 3.3.1). Nan people have been labelled ‘forest and water destroyers’, an image which upset Rin [Rin 202; 504]. Still, some tree conservation projects reflect a management strategy based on an anthropocentric view of the forest. This was self-evident in a slogan at a tree planting project on a mountain of Muang Chang (8th January 2014) which stated: ‘Make Phu Piang district, together with its forests and rivers a living home’ [438]. The message implied that, in the view of the project manager, people and their environment were initially separated; they had to be ‘made’ united.

Yet for many Muang Chang villagers, the forests were entirely internalised. To lose the forests was to lose natural resources, food, weather and water that afforded people their livelihood [Sai, Tai, Rak, Fa F774-781], identity and sense of place (see Section 6.2.3). Furthermore, the loss of forest also revealed the power of the elite and wider socioeconomic structures that overshadowed individual villagers and destabilised the homogeneity of Muang Chang. This was clear in Sai’s conversation as she took me to a hill to observe the problem:

People from Songkhla [southern Thailand] came here to plant rubber and pine. It is the rich people that burned down the forest. Even the [Muang Chang] sub-district headman grew maize. “His highness” was never a role model.

This year is the sixth year of drought. Almost all of these lands were owned by capitalists, only a few belonged to citizens. And how can my community develop? It is very difficult. It’s not bountiful. There is no forest left.

It hurts, it’s painful. Soon this place won’t belong to our people...Soon there won’t be Nan people or Muang Chang people. In my opinion, [we will be] speaking different mind sets, different languages. The southern people speak their ways. Could they stop burning? No, they won’t. People won’t speak Muang language or even Thai. It will turn to industry and hotels. This will be difficult for our livelihood. It will be more difficult to find bamboo and mushroom. It will be more difficult for people of Muang Chang to find food. That’s really heart-aching.

But it’s not my generation that sold the land. It was my parent’s generation 20 years ago. They sold land to send children to gain higher education and degrees. But they [the children] never come back to inherit the land.

[Sai 1332-1347]

The people of Village M choose to address this problem by conducting a ‘forest ordination’ ceremony (Darlington 2003, and see Chapter 3, Section 3.3.2) every March. In contrast to the tree planting project above, the inextricable human-plant-spirit relationship is made more explicit and sacred by wrapping the monks’ robes around the trees to symbolise their ‘monk’ status (see also Section 6.2.4 and Chapter, Section 7.2.3). As mentioned in Darlington (2003), this contemporary ceremony was invented by the venerable Pra Kru Pitak who is strongly linked to, and well-respected by, JK and the villagers of Village M. Apart from this ceremony, villagers ask for donations, which are used for buying previously or currently farmed land pieces owned by individuals and turning them into community forest. [F11-24; Rin F775].

Forests and other monocrops are always competing for their space and legitimacy on the mountains of Nan (see Chapter 3, Section 3.3.1). For example, during the focus group, a truck drove by, and with a loud speaker, advertised the superb qualities of Pioneer Company’s maize seed ‘B80’. ‘See the way they [maize seeds] are advertised?’, Sai exclaimed. ‘How could the farmers not plant them with that much subsidy from the Company?’ [Sai F185]. The deforestation-maize plantation-haze pollution problem (see Chapter 7, Section 7.1.2) also sparked divided opinions in the focus group. While Sai wanted zero maize in the hills of Village M [Sai 829], Mai, Fa and Wai defended their practices as ones of survival and rejected them being seen as unsustainable and air polluting, compared to those in Santisuk sub-district, south of Muang Chang, who planted maize for commercial purposes [F831-834]. They declared that they would be happy to reduce the area of planting but would never abandon their activity. Thus, the land and sky became a territory of both conflict and negotiation (see Chapter 7, Section 7.1.2). At least they all agreed that they wanted to be less dependent on corporate maize seed and contract farming, and that the villagers needed to increase the area of community forest.

6.2.4 Flexible Farmers and Smart Farmers

The group of middle-aged, future-looking farmers like Po, Sai and Rin planned to set up a community farm enterprise in the village in 2016 with the help of local authorities, JK and Agriculture and Land Reform Office. In effect, whilst engaging in the revival and re-learning of traditional agricultural practices, their aim was to incorporate modern technologies, as well as cross new frontiers that older farmers have never done before – that of enrolling into the local and regional market, re-brand their products, find niche

markets, and directly link with consumers. [Rin 110, 1458, 1499; Po 2168-70]. These characteristics and practices match Santasombat's (2008) description of 'flexible peasants' in the context of developing countries, where they are 'protectors of forests, manager of biodiversity and genetic resources, and champion of the environment' (Santasombat 2008, p.172). Subsistence farmers have not completely given way to commercial farming or to globalisation, but are re-constructing themselves so as to thrive along with the changes. This view is sharply contrasted with the outsider's representation of such communities as endemic, static and primitive (Santasombat 2008).

The objectives and activities of these 'flexible' Village M farmers are similar to those of the 'Smart Farmers'. The programme 'Smart Farmer and Smart Officer' was initiated in 2012 by the Ministry of Agriculture and Cooperatives to encourage farmers to pursue green economy agriculture (Ministry of Agriculture and Cooperatives 2013). Nan ALRO was responsible for implementation of the programme in Nan. At the opening ceremony of Muang Chang's Lychee festival, 3rd May 2014, the Nan City Governor announced to the audience: 'we are going to be "Smart Farmers"' [1578], and implied that associating this with the identity of Nan farmers would improve their lychee marketing channels.

But being 'Smart' isn't easy, as one needs to have at least 180,000 Baht of income per household per year, and prove competency in one or more of the six criteria, for example: farm management; certified in organic farming practice; or competent in information and technology. For Rin, being a Smart Farmer involved doing completely 'untraditional' [512] and 'useless' things [514] and furthermore, she would have to pay for a 'Smart Officer' to assess her work, thereby 'buying into' the idea that a farmer could not be 'Smart' without the 'Officer'. Similarly, certification of being 'Smart' came with certain expectations, ideologies and values that shaped normal farmers from a distance and up close (Latour 1993).

In late 2014, the 'Smart Farmer' programme in Village M came to a halt as the small group of farmers were not ready. However, they continued their own 'flexible' path, which Po summarised as follows:

I have gone to many workshops, exchanging knowledges. We won't surrender to the corporates...

...Next year I will try using another piece of traditional knowledge. And in the end [the modern knowledge] would be defeated by the old traditional knowledge. Traditional knowledge is about experimenting. If this year it doesn't work, we will try a different plan.

[Po 2771-76]

Nevertheless, even without the 'Smart Farmer' programme, it should be noted that villagers' visions and practices are shaped, and will continue to be shaped by, external organisations like JK and Nan ALRO.

6.2.5 Climate-change and Food Security

Apart from the activities above, global warming and climate-change have become the latest issues that the local people have been engaged with in recent years. Unsurprisingly, their interests are largely brought in and influenced by JK and related organisations, radio and television programmes (see Chapter 8 Section 8.2 on climate communication, and Table 8.2 on imported terms). The Nan-based JK organisation 'only learned about climate-change issue for the first time' [Ing 73] in 2009 when Greenpeace Thailand commissioned the former to set up a local campaign in Nan. Among other local issues, JK acts as a focal point, linking networks of villagers from different districts to external organisations like CBDC, SEARICE and EuropeAid (see Chapter 3, Section 3.3.3). Their general aims are to link climate-change to issues of food security and natural resource management among smallholder farmers.

The approval and implementation of international ideas and projects requires identification of local problems. The project proposal written to EuropeAid was as a result of the 'unexpected' 2006 flood that revealed Muang Chang to be a physically and socially vulnerable landscape where farmers were not implementing any form of long term disaster-crop management [Ing 73] (see Chapter 3, Section 3.3.3). According to Ing, an officer of JK, Muang Chang is vulnerable to changes in climate because:

One, they were in a watershed. Two, in terms of climate change or environment, the province was defined as, in English terms they call it, "environmentally-sensitive area". The watershed areas were environmentally vulnerable to [the incoming and growing] monocrops and maize, and we also see that they are related to food security

[Ing 73]

JK also played a large role in exposing local villagers to climate-change information. From my interview with Ing, it transpired that she had taken a group of farmers to an international conference on climate-agriculture policy, and had asked them to share the

knowledge and experience with fellow farmers upon returning to their villages [Ing 75]. In addition, she also admitted customising part of a climate-project by adding, based on her personal research interest, survey questions on climate-change issues, which were outside of the project's initial scope [Ing 75].

In sum, Joko and their network have slowly and implicitly instilled global warming and climate-change information in Nan communities by linking with disaster, agriculture and food security. As a result, Village M has become a site for acquiring global knowledge and applying this knowledge to the local context. However, in my ethnography (2013-14), the terms global warming and climate-change were very rarely mentioned by people of Village M probably because Joko were only beginning to implement a much more direct approach to disseminating climate-change information in 2015, just after I left the field (see Chapter 8 Section 8.2.3). As shown in Chapter 8, without individual academic researchers and these local and international organisations, the global discourse of climate-change would not be disseminated and incorporated in Nan province.

6.3 Making and Becoming Muang Chang

Muang Chang and its Village M are made up of 1) physical interactions between farmers, the weather-world, and plants (and spirits); 2) symbolic imaginations such as 'backward' place and people, economically 'sufficient' farmers, and forest destroyers/protectors; and 3) networks of farmers and organisations such as local, national and international government and non-governmental organisations. Each component partially weaves their ontologies, interactions and actions in shaping and creating the ongoing and rich tapestry of life in Muang Chang and Village M. In making arguments, and gaining credibility, each actor must take into account the histories, visions and dreams which each individual site is imbued with (Jasanoff & Sang-Hyun Kim 2015; Livingstone 2010).

Muang Chang sub-district has become, as Cloke and Jones put it a, 'multiembodied, multipractised business of moving along the path' (2001, p.664). Through maps and reports, Nan's difficult and marginalised terrains are defined objectively as a refuge for people of a certain political party, and an underdeveloped territory in need of modernisation and centralisation. It has also been found to be rich in natural resources

with potential for exploitation. In contrast, for local inhabitants, Muang Chang is first and foremost a living home, where culture and nature are inextricably and harmoniously entwined, a place that is known and felt by its inhabitants bodily, sensually, culturally and historically. Through experimenting with plant genetics, reviving, re-learning and sharing traditional knowledge, practising and inventing new religious ceremonies, the living home is enacted and re-vitalised to become a space of grassroots resistance to counter the image of backward swidden cultivators and forest destroyers. In the near future, Muang Chang will also become a site for researching, transferring, learning and applying knowledge. These are only some examples of the multiplicity of Muang Chang identities that make up its cultural landscape.

In this Chapter, I have shown that villagers familiarised themselves with and gained knowledge about their own hill-valley agrarian landscape by simply living their own life, being in, moving through and interacting with the hills and valleys, forest, rivers and the weather. These local biogeographies, landscapes and skylscapes of Muang Chang are cultural resources that reflect the evolution and use of knowledge for sustainable resource management (Santasombat 2008). In the following chapter, I return to this argument, but with a specific focus on experience, knowledge and meaning making of the weather and the three seasons of Village M. I show how the moods and topics of conversation in conjunction with narratives about their livelihoods changed as the seasons progressed. Nevertheless, these farming livelihoods are penetrated by geographical imaginations, knowledges and policies. Similarly, the discourses of global climate-change also came in contact directly and indirectly with local weather experiences and knowledges. Intersections, cohesion and conflicts are explored in Chapter 8, where I specifically examine the role of organisations at various operational levels in communicating climate-change information to local Thai people. It should be stressed again that how people of Village M understood their weather and seasons and interpreted the external discourse of climate-change must be read in the wider context of their agricultural 'experimental laboratories' (Santasombat 2008, p.31), and their interactions and responses to the flows and networks of materials, human and nonhuman actors and organisations.

Chapter 7: Experiencing, Remembering and Interpreting the Weather in Everyday Life

In Chapter 6, I described how M villagers, their agricultural livelihoods, plants and weather, make up the totality of Muang Chang. Through dwelling, the knowledge about the place and its constituents are incorporated bodily and mentally. But as shown in Chapter 5, as an outsider researcher at that point, my relatively limited weather knowledge was built up from clues drawn from things in my house or along paths into the Village and from the fields. In this chapter, written in the style of phenomenology and relational geography (Country et al. 2015; Ingold 2000; Krause 2013), I present the weather-world from the perspectives of the villagers as documented from November 2013 to December 2014. In Section 7.1, I describe the journeys through the three seasonal cycles, deeply meaningful to, and bound up in, farmer's identities and practices: winter was about nostalgia (Section 7.1.1); summer was about learning to endure (Section 7.1.2); and the rainy season was about life and death (Section 7.1.3). Section 7.1.4 shows the secondary sources of knowledges that complemented direct experience, such as a the traditional Muang almanac and scientific weather forecasts, used to help inform decision-making. There was a certain flexibility in terms of which the knowledges were chosen, with trust and personal values playing a significant part. In sum, weather knowledge emerged from the connectedness and co-becoming of human and nonhuman movements on the cultural history and landscape of Village M.

Section 7.2 focuses on people's perceptions of and responses to changes in the weather. The idea of 'appropriateness' of the weather (Section 7.2.1) shows that physical changes in the weather cannot be separated from cultural, religious and moral expectations. It also raises questions of causal agency in terms of the tripartite nature-deity-human relationship. From an animist perspective (Section 7.2.2), bad weather changes were explained by spirits and deities that required appeasing through the enactment of rites, fearing punishment, and hoping for blessings. From a Buddhist perspective, (Section 7.2.3), people learned not to overcome, but to endure, adjust to and become one with nature. Finally, from a moral perspective (Section 7.2.4), inappropriate weather requires not fixing the weather, but a deep individual and societal transformation back to the past that has made them who they are today.

In Section 7.3, I conclude by arguing that the weather-world contains moral lessons that put humans in a larger relational field among other forces. The appropriateness of the weather becomes a lens for understanding their diverse and somewhat incoherent worldviews and ways of responding to local environmental changes, even for a small sample of participants in a village of northern Thailand.

7.1 Knowing and Experiencing the Flows of Weather and Seasons

7.1.1 Winter

For the people of Village M, winter was their favourite season; winter was about celebration and also nostalgia for the farmer's identity and livelihood. The sharp cold air could not be separated from the celebrations both sacred and profane that surrounded the rice harvest, as well as acknowledgement of the struggles involved in the subsistence livelihoods of the past, and feelings of pride for what had been achieved and overcome.

The Good (C)old Days

Once the seeds were sown in the rainy season, farmers looked out for signs of the onset of winter. *Lom now*, or 'the Cold wind' usually comes at the end of the Buddhist Lent in late October, or by Loy Krathong festival, in mid-November, bringing morning fog, crispy cold mornings and nights, and cloudless skies.

The villagers experienced exceptionally cold weather in their bones, as though imprinted in childhood. For example, Parn remembered walking to school in winter some thirty years ago, her cheek 'cracked and red [...] It was shivering!' [3168]. Back then, the air was as cold as snow [Vej 3220] and water was ice-cold; nobody wanted to touch it [F484 Fa]; villagers had to gather around a campfire to keep warm. The cold caused physical pain, making it difficult to engage in all manner of activities. As Jerstad (2014, p.407) notes, the impact of weather does not stop at the boundary of the skin:

In [January] 1998, it was so cold that banana trees turned yellow. All banana trees in Nan died. When I rode my motorbike taxi at 2 a.m. it was so painfully cold into the bones!

[Ping 253]

Normally, during dry season rice farming, the water is ice-cold. I don't want to go into the field. Villagers don't want to do dry season rice farming because it is cold. They would store enough rice grain from the previous wet season so that they don't have to plant during dry season.

[Rin 583]

Paradoxically, people longed for these cold winters and the longing became part of their identity (see below). However, not everyone liked cold weather. Nong reasoned that thick sleeping gear was uncomfortable:

I like summer, it is comfortable. But in winter the blanket is heavy. It is difficult to get up. In summer if it is hot I just take my shirt off.

[Nong 2519]

I don't have body fat...No, I can't stand it. I don't like winter.

[Nong 2525]

Nong was a very lean man, and the only blacksmith of Village M, who seemed more comfortable in the heat of the open-air rather than in enclosed spaces.

What is considered a 'good' winter depends on associated activities. In a group conversation among farmers, the ideal temperature for rice harvesting is 20-22 degrees Celsius [3102], with a light breeze [3145-47], pollution-free air [3143-3147]. Sunlight was needed for warming up the body [3114], and drying the freshly harvested rice [3143]. But the farmers preferred cloudy skies so they only received indirect heat and could work longer. 'Harvesting is only possible in the morning', Pree told me, because by 11 a.m. the temperature quickly rises above 25 degrees, and 'the air [weather] is no longer 'good'. 'That's global warming!' [3131], shouted an anonymous voice⁶⁵. Experiencing the 'good' winter was restricted to the morning hours:

Chiang Mai people [like CV] don't know what real cold weather is because they wake up late. They go to work at 7-8 o'clock but people here wake up at 5. Cold air [weather], clear sky. It's clear.

[Hong 763]

Hong's words struck me as they illustrated how weather experience is not only seasonal- but also livelihood-, identity-, time- and place-specific. A 'true' winter for a Nan farmer was a very different socio-natural assemblage than a 'true' winter for a Chiang Mai office worker.

⁶⁵ This person mentioned the word global warming because she overheard my earlier conversation with other farmers on global warming.

A Surprise Interruption

The rainy season can be seen as a precursor and predictor of the winter that will follow. Because the rain in 2014 came late (see Section 7.1.3), Sai believed that *lom now* would come 20 days later than usual [2713]. The 2013 rain was also perceived to be below average, hence a mild winter was expected, and indeed, jacket sales had been low since 2011 [Ping 254]. But in the first week of December 2013, a strange rain came and suddenly the forecasted mild winter turned into one of the longest cold periods (see Chapter 5). Its impact was wilting tobacco leaves, the appearance of the rare silverberries (*Elaeagnus latifolia*), a very high rate of lychee and longan fruiting (see Section 7.1.2), and persistent fog which delayed rice threshing. At home, it was so cold that housewives needed boiling water to wash greasy dishes [F484-6]. The temperature fell below 15 degrees, and even with a jacket, Nong felt cold [1980]. Sealing off wind gaps in bedroom walls became routine in December and January [F499]. This unexpected winter rain of 2014 was comparable to what Pierre Orts, the Belgian legal advisor had experienced in November 1897, in terms of the degrees of surprises and persistence of the cold spell (see Chapter 3, Section 3.2.3).

By attending and responding to, and co-becoming with these conditions, the villagers experienced the 2013-14 winter, that penetrated through homes and the fields, as abnormal and as result, new practices evolved and new memories were laid down. However, this longest lasting cold spell was seen as an exception, temporarily upsetting the recent warming trend. This ‘parasitic interruption’ (Tschakert 2007, p.389) didn’t stop Vej [3327] from believing that, in the future, there would be no winter, just like in southern Thailand.

Joy, Generosity and Nostalgia

Rice harvesting makes winter joyful and spiritually auspicious and sacred. (Davis 1984; see Chapter 6, Section 6.1.4). Ped, an officer at the Department of Land Reform, and a part-time farmer, talked of why he liked winter:

This season is the season that you can observe livelihood easily – farmers’ livelihood. The air [weather] is also good. The scenery is good, the atmosphere is good, and people’s livelihood is also good. In harvesting – as livelihood – people are joyful, aren’t they? This is the time of farmer’s life that they are happy – harvesting rice, storing rice in granary, drinking and having fun with friends. The air [weather] is also nice and comfortable. Getting money from selling rice, getting money from selling maize. [Laughing]. [Winter is] the happy time for farmers.

[Ped, interview]

Sai similarly saw winter as a season of happiness and abundance and emphasised the social dimensions of winter:

Winter is the time of waiting for [the result of our] labour. It is happiness. We get to do many things like planting vegetable. Vegetables, like cabbages, are beautiful in winter. And the night time is long.

[Sai 3278]

Talking about happiness when I was a child. Well, it was about when my father went to harvest rice. There were fruits and orange. I learned about solidarity, visiting friends, sharing, asking for favour, sharing labour like that day that you helped in Rin's rice field. If people don't have good feelings for each other, we won't be visiting one another. I want our lives to return to what it used to be. In the past, uncles and aunties all helped planting and carrying whatever they wanted [to have or eat]. We give things to each other because of kindness. They didn't think in terms of money. We ate whatever we wanted according to what we had. If we had chicken, we got to eat chicken. If we had pork then we share with other people.

[Sai 3280]

Both quotes evoke winter rice harvesting as about enjoying the rewards of hard work. Kinship and solidarity give special meaning to the winter rice harvest. However, Sai sees money and materialism [3280] as slowly eroding this climate-culture relationship. Here, the past climate and culture become both magnifying glass and mirror (Hulme 2009, pp.362–363) for re-examining the cultural values of Muang Chang villagers today, as the passage below from the focus group illustrates:

In the past, we were so poor, weren't we? That's why it was always very cold. No matter how many blankets you have, if it was a wooden house, the wind would always be blowing into the house [because of gaps between wood pieces].

[Mai F515]

In the past when I raised my children, in some days I didn't have even a penny. But at our house we had [home-grown] vegetables to eat. But no, I couldn't afford anything.

[Mali F518]

I'd say this is sufficient living. Since then we became richer and we didn't carry any debt.

[Wai F523]

Sufficiency and no debt, yes, but now we have huge debt and plenty to eat! [Laughs]
It is the opposite!

[Rin F524]

Here, cold weather and poverty meld into one. Over time, socioeconomic developments along with better designed houses, have helped people overcome the

negative experiences of cold weather and hardship (Hall & Endfield 2016, p.14), yet pride, solidarity and sufficiency continued to play an important part in their cultural identity. Villagers believed that living by their ancestors' cultural values and frugal livelihoods, gave them the mental and cultural strength to cope with difficulties, whether poverty or climate. People like Sai, Wai, Mali and many others yearned for this cultural resilience, negatively comparing present day winters, crop production and cultural values with those of the past. Winter encapsulated memories of joy and triumph in adversity, becoming a source of strength in moving forward.

Knowing the Rain 1: *Pak Pu Ya*

In this season, another predictor of rainfall was the presence of *Pak Pu Ya* (*Caesalpinia mimosoides* Lamk.). The pod of this 'grandparent plant', available at the start of the year, was believed by village elders to be one of the most reliable natural rain forecaster (four to five months in advance). The position of the three seeds in its pod indicates the timing of rain (see Figure 7.1). For the 2014 rain, the seed was in the outermost position, indicating delayed rain (see Section 7.1.3). For 2015, the seed position was in the middle, indicating punctual rain (but in fact the rain was also delayed). Cultural (Section 7.1.2) and technological (Section 7.1.3) rain forecasters were also consulted alongside this natural rain forecaster.



Figure 7. 1 Pod of *Pak Pu Ya* [grandparent plant] of early 2014 (top) and of early 2015 (bottom)

7.1.2 Summer

The heat of summer is often expressed in terms of ability to work in the fields, and there emerges farmer's identities of endurance and toughness. These are cultural resources used in response to the different challenges of activities that go on in summer. Disciplined emotional responses to arduous weather in the fields were also released and were transformed to gladness in community social events. In this period, farmers were alert to any clues about the coming rain.

Sunburn, Beauty, Health and Heat Threshold

A 'good' summer has traditionally been seen as the hot ending of a long winter, usually confined to the months of April and May. But today's summer is hotter and longer than in the past.

Direct exposure to the rays of the summer sun, for Dang, 'hurts and burns' the body [2698]. Even in the shade, the 'flame of heat' can still be felt on one's skin [Dap 573]. In mid-February, under an intense sun, Rin said:

This is so hot. But we must turn our backs to the sun. It is better our backs feel hot than our faces. Black face. I'm not beautiful with blemishes

[Rin 582]

While Sai tried her best to protect her skin from sun damage, the heat was also a concern from a health perspective:

Good weather is comfortable. No coughing. Clear sky and fresh. Abnormal weather is when you have back pain, cough and body can't adjust to it [the weather].

[Lek 3108-9]

At present, it is abnormally hot. In the past, I could live with it. Now, I can't withstand it. It's like strong hot wind. Is it because of our bodies? perhaps aging has something to do with it.

[Po 2942]

These quotes may be evidence of gender differences in perceptions and experiences of weather, which may also relate to the gendered division of labour in agrarian society (Mustafa et al. 2015; Nightingale 2006; Tschakert et al. 2013) in relation to beauty and masculinity and how perceptions of heat may change in the aging process.

While people were able to describe in detail the specific atmospheric conditions for a 'good' winter, little information was given to a 'good' summer. In most cases, they would prefer something not too hot so that they could still work in the fields. On separate occasions, they gave a range of temperatures they believed to be tolerable:

If it is about 40 degrees, I think it has to happen over there at Boklua⁶⁶. In our village, if it's 40 we probably already can't work.

[Sai 1531]

Summer this year has been very hot.... I looked at my thermometer and it read 30 something in May. But I have never seen it go over 40.

[Jan/Wan 1945]

This absolute number derived from the weather forecast or thermometer was made sense of in relation to, and represented by, their bodies that were engaged in harvesting lychee in the orchards. Temperatures above 40 degrees were almost unimaginable, beyond sensory memory.

Emotion, Disciplining and Sarcasm

Controlling one's emotions was a form of mental coping strategy against physical discomfort. In the summer, Dang (aged over 65) said: 'I can't be moody because I have heart disease. I need to *tum jai*. Can't be stressed' [Dang 3294]. To *tum jai* (to 'make heart') is to, first, accept the reality of the heat, and second, restrain one's negative emotions. Other forms of coping involved the use of sarcasm and humour (Hudak et al. 1991; Nevo et al. 1993). During two separate hot days, I overheard the following utterances:

It is very hot. The temperature is 35... It is now so hot that I feel cold. So hot that I have goose bumps...

[Hong 1721]

Oh, it is so cold isn't it! This is the taste of life. Sometimes it is sour like lime.

[Sai 2553]

Emotional discipline, acceptance and sarcasm reinforced the fatalism with which Muang people, viewed life, as proposed in Mary Douglas's Cultural Theory of Risk (Davis 1984, pp.72–73). It is human minds that need to change, not the natural world.

(Re)constructing Identities

In keeping with the idea of karma and fatalism (see Section 7.2.2), changes in weather and seasons were thought of as life lessons. Acceptance and withstanding change is part of a farmer's identity:

See? This is what it is like to be born as human. [You have to] withstand the wind, sun, rain.

[Sai 1451]

⁶⁶ Boklua is a sub-district about 80 km north of Muang Chang.

See? This is life of Thai farmers. Lang su fa, na su din

[Sai 2554]

The famous Thai saying '*lang su fa, na su din*', literally translated as 'backs fight the sky, faces fight the earth', describes the typical bodily posture adopted during rice farming (see Figure 7.2). The saying praises the weathered bodies and the arduous, backbreaking work that farmers have to endure. But farmers are not alone. By dwelling in the 'moral space' (Huber & Pedersen 1997), they are immersed and weathered in the flux of the sky (Ingold 2007). The movements and intentions – rice in the hands, feet in the paddy field, and bodies in the air – are as one, watched over by the spirits and deities. In a sense, the farmer identity, as reflected in this saying, emerges from, and is co-constituted by, the physical labour, livelihoods and Muang's belief system, binding humans, nonhumans and celestial beings in this weather-world, so that there are no longer separate objects or places to act upon (Country et al. 2016; Ingold 2000).



Figure 7. 2 'Backs face the sky, faces face the earth' bodily posture during dry-season rice planting. Note the hazy sky and blurry mountain in the background.

By re-living and re-producing this embodied, sensuous practice of rice farming over the course of a life time, and combining it with modern agriculture knowledge and techniques, the farmers' tenacity becomes a cultural resource for 'flexible' adaptation

(Santasombat 2008) to changes in the earth, the sky and many more invisible forces (see Chapter 6, Section 6.2).

Evil Sky and Evil Identity

From February to April, the beautiful clear sky of winter becomes hazy due to pollution from the burning of crop stubbles so that mountain ranges can barely be seen (see Figure 5.9 in Chapter 5, and figure 7.2). The mountains and forests, symbols of the villagers' intimate relationship with nature (Darlington 2003, see also Section 6.3.3 Chapter 6), stand in contrast with, and are obscured by, haze pollution, a symbol of deforestation and corrupted morals caused by 'those from other villages' [Jan 609; Rin 622; Sai 1332; Wai F557]. The Village and its people feel suffocated by bad air and malevolent skies, caused by deforestation and biomass burning:

CV showed a photograph depicting a view of Village M, taken in March 2014

See? This photograph that you took, I knew it is haze pollution. The sky, if it is bright and uncontaminated, it is beautiful.

[Sai 1895]

[The photo] is [only] beautiful because you can see our village. But it doesn't go with the sky at all! I can't stand it.

[Sai 1897]

CV showed a photograph depicting a view of Village M, taken in April 2014

The haze, it started to fade away. Compared to the other pictures [of previous months], those ones you just couldn't see the mountains. That's evil...

[Sai 1907]

It was only between February and April, that conflict arose between the auspicious landscape of Village M, and the skyscape, a natural, cultural resource, and public space, caused by those who held an opposing worldview to that of farmers like Sai who wanted to conserve nature and maintain a sustainable livelihood.

Deforestation and haze pollution are often associated with the discourse '*lok ron*', or global warming. Table 7.1 shows the channels through which the notion of 'global warming' is known, its interpretations and socio-natural assemblages. In addition to the idea of heat in relation to health, illness and work rate in the fields (see Jerstad 2014), this foreign term is narrowly framed around local environmental problems like deforestation, crop burning, haze pollution, and litter, and these assemblages are *made visible* (Rudiak-Gould 2013) through various scientific and policy domains. It should be noted that, unless being prompted by my questions in relation to these local issues, the

terms ‘global warming’ and ‘climate-change’ were almost never mentioned by the farmers themselves. Like in Kiribati of Pacific Islands (Kuruppu & Liverman 2011) Peru (Paerregaard 2013) and Tibet (Byg & Salick 2009), ‘global warming’ has become a shorthand explanation for local changes caused by local people. The advantages and disadvantages of this communication strategy are discussed in detail in Chapter 8, Section 8.2.

Table 7. 1 ‘Visibility’ of global warming and its manifestations at Village M.

Visibility of ‘lok ron’ (Global Warming)	
Personal observation	Media-influenced
Assemblage P1: heat	Assemblage M1: deforestation-burning-haze
‘Lack of moisture. There’s only heat...At present the air [weather] has gotten much hotter. Much more heat. That’s what they said it’s ‘lok ron’. But I rarely heard of it’ [Mek 3135]	‘I heard about lok ron from radio. It’s the smoke from burning that make us uncomfortable, sometimes cold, sometimes hot. In the past, lok ron didn’t exist’ [Pree 1327]
‘It hasn’t been cold for two years already. But perhaps this is what they called ‘lok ron’. I heard it from TV’ [Nam 28-29]	‘Talking about ‘lok ron’...see, in April, people will start burning. They will cut down forest to plant maize. The sky will not be like what we are used to seeing. Plumes of smoke will rise’ [Rin 517]
‘Lok ron? oh you see it in the afternoon’. It doesn’t happen in the morning. In the past, by this time [November] it was already cold. You’d have needed a blanket. Now it’s no longer cold’ [Fon 3137]	‘In the past, it was extraordinary cold. The weather was bountiful. Many trees. But the CP corporate gave us things, chemicals and fertilisers. The air [weather] became hot’. ‘The world is getting hotter, [it is because] we don’t have trees.’ [Fa 1341-42]
	‘Lok ron’ is related to burning the forest. But our village doesn’t really do that [Fa 2944] ‘Our village doesn’t do it, but the others do’ [Po 2945]
	‘[Agricultural Land Reform Office] they gave incentive of 500 Baht to those farmers who don’t burn their crop after harvest’ [Rin 355]
Assemblage P2: heat and health	Assemblage M2: waste management
Now, it is abnormally hot. In the past, I could tolerate it. Now, I can’t. I’s like a strong hot wind. Is it because of our bodies? Perhaps aging has something to do with it. [Po 2942] ‘Lok ron’, when it is hot...I don’t know how to describe it... you just can’t tolerate it if	[CV] Who causes abnormal weather? ‘Because of ‘lok ron’! You see, the plastic bags stay in the earth for 10 years and still do not degrade. That’s what I learned from a workshop’ [Po 2942]

you don't take a break [during a farming activity] [Po 2942]	
	'The TV announcement from the government says don't litter, it will make the society [world] hot. Don't burn trees, it will be hot. No burning [Tae 3120]
	'From a workshop, they said just manage waste. Don't use chemicals or plastic bags' [Rin 3150]
	'Philippines marks one year since typhoon Haiyan. The country faced a more extreme disaster because of "lok ron", the experts say. What the Filipino citizen could do to reduce future disasters is simply manage and recycle their wastes...' [news from Channel 3, 9 th November 2014]

Surprise

By March 2014, farmers started to worry about the drought, witnessing the dried-out ponds and rising utility bills. Mali's 2014 summer water bills almost doubled compared to the previous year [3323-24]. She was surprised and disappointed. In the home, electric fans and extra showers were needed, thereby also increasing electricity bills.

The biggest surprise of 2014 was the unimaginably large amount of lychee fruit [Kob 859; Sai 1044] because of the 2013-14 winter. At first, people were happy because of the abundance but then because of excess, the price kept dropping until they hardly made any profit; as Nong [1648] remarked: 'the weather was certain [to help produce lychee], but not the market price'. Moods swung dramatically from surprise to cheerfulness, then anger towards the government for not stabilising fruit prices.

Happiness

Family gatherings to celebrate Songkran, the northern Thai New Year (12-15th April), provided welcome respite from the emotional turmoil that accompanied the unexpectedly hot summer, as Jai explains:

Summer, well, in its social aspect, I like it. There are many events; seeing relatives, seeing this person and that person. In summer, we repair our houses, and many other things. Helping each other. And there are Songkran, and other major religious events are all squeezed in summer. I think it is reasonable because there isn't that much [agriculture] work. It is more about traditional events. It is fun in these social events.

[Jai, interview]

While in winter, happiness arose from reconstructing farmer identity, in summer, Songkran served as a spiritual renewal for the entire village and the opportunity to reconnect with friends and family (Davis 1984; see Chapter 5, Section 5.3).

Knowing the Rain 2: Muang Almanac

The first tropical storms arrived at the end of March 2014, just as Pon expected [1367]. The rain was heavy enough to clear away the haze and bring relief from the heat [Num 1405], but not enough for the thirsty soil and plants. It was getting drier. Could *Pak Pu Ya*'s prediction be true?

During Songkran, the Buddhist abbot of Village M Temple would read to villagers the predicted future world and likelihood of rainfall as outlined in the traditional Muang almanac (Davis 1976; 1984). The 2014 prediction was social decline, potential drought and unpredictable weather events and crop yields (Figure 7.3). The northern Thai almanac is similar to the British Victorian one, as they both 'link natural and human worlds, connecting sequences of seasons and planetary motions to worldly cycles of academic terms, legal sessions and fairs' (Anderson 2005, p.56), their common purpose being to make sense of regularities of seasons and society (Jankovic 2001).



Muang Almanac: Buddhist year 2557 [2014]

[Red star] **Abbot:** ‘Pra Kru Chaya-Nunta-Muni’

[Red circle] **New Year:** ‘There will be changes and conflicts. There will be corruption problem and loss of important figures. The price of white things, red things and black things will rise. There will be more investments and trading. There will be fire hazard and disaster. There will be drought, and crops will be damaged. There will be variations in earth, sky and air [weather]’.

[Green circle] **Rain and water forecast:** '5 Nagas in the ocean, providing a total of 400 ha of rain. It falls into the Mountain of the Universe Mt. Sineru 160 ha, into Himmapan Forest 120 ha, in the Universal Ocean 80 ha, and into Human world 40 ha'.

[Black circle] **Food staple forecast:** ‘There will be some gain and some losses for young rice in paddy fields’.

[Blue star] **Publisher:** ‘Kamron-Sukanya Na Lampoon’

Figure 7. 3 A printed traditional Muang almanac for 2014. Content in the red box predicts individual and social affairs, in the green, predicts water and rain availability, and in black predicts rice yields. The red star indicates the name of the chief abbot of Cha Hang Temple. The blue start indicates the name and address of the publisher

From 2011 to 2014, the amount of rain ‘that [fell] into the Human world’ (see Figure 7.3) were 40, 50, 60 and 40 ha⁶⁷ of rain, respectively. Interestingly, these figures are inconsistent with observed weather conditions⁶⁸. But as Davis (1984) and Jankovic (2001) argue, traditional almanacs are less about reasoning and accuracy, and more about practicality: information about rainfall can help make decisions. Roughly speaking, above 40 ha of rain means flooding; lower than 30 means drought:

In a year when it rained 35 ha, the air [weather] was good. Our community was not hot [distressed]. In a year when it rained 25 ha, we didn’t have enough to eat. Productivity was low.

[Vej 3179]

If it only rains 10 ha then we need to pump a lot of water because there is going to be a drought. If it rains 60-70 ha then it is going to flood villages at the south [of Village M]. Central and Southern Thai will also be in trouble.

[Jan 2985]

Despite inconsistencies, village elders never challenged the almanac because it was produced by the holy monks at Chae Hang temple, Nan’s most sacred temple [Pon F324-26; Jan 2957], as Wai [2896] put it: ‘the almanac, it is trustworthy. It is ancient knowledge from Chae Hang. Here, we believe in it’. In contrast, younger villagers like Rin and Po challenged the power of the almanac, believing that predictions from the televised Royal Ploughing Day were more accurate. In addition, they expressed concern that the almanac isn’t accessible to the illiterate, signifying that literacy, class and social status influence the access to information and decision-making of risk (Nightingale 2006). Rin prefers the information that can be easily accessed by everyone:

[CV] what sources of information do you use for predicting the rain?

[There are a few] but I think the Royal Ploughing Day is more accurate. Villagers are not given the almanac, so they don’t get to read much. Sometimes the village headman doesn’t pick it up from the temple. So more often I watch TV.

⁶⁷ The numbers represent pseudo units of measurement equivalent to the volume of one Buddhist alms.

⁶⁸ Year 2011 was actually a flood year, but the almanac predicted drought. Year 2014 was a (relatively) dry year, but the rainfall figure in the almanac was the same as that of 2011, instead of being lower to indicate water deficit.

Interestingly, Vej remembered that in 2006, the year in which there was a major flood happened (see Section 7.2.3), the prediction was of slightly over 40 ha of rain [Vej 3180] (while Jan, the wise man, remembered the figure was up to 60 ha of rain). This led Vej to believe that the 2014 drought should have corresponded to about 25 ha, not 40 ha of rain, showing firstly, that the predictions may not always be accurate or consistent to real world phenomenon. Secondly, that inaccurate predictions can result from false memories about rainfall figures.

[In the almanac] I like to read for the auspicious dates only. The almanac isn't that important in daily life. Most of the time I listen to the weather forecast
[Rin 2836]

Jan, the wise man, however, dismissed this central source because of its inauthenticity [2981], implying that rain could only be predicted through Muang knowledge. Between the two age groups, reasons for subscribing to one or other source were based on several factors: the authenticity and origin of cultural knowledge, accessibility of information and accuracy of prediction. These cultural factors then must be taken in to account in risk management (Adger et al. 2012; Krüger et al. 2015).

No one in Village M seemed to know or question how the almanac was made, and by whom. I found out that the almanac wasn't produced by the abbot of Chae Hang Temple like the villagers believed, or as indicated in the leaflet (see the red start in Figure 7.3). Instead, it was 'compiled' by Mr. Kamron, an ex-politician instead (see Box 7.1). I didn't dare reveal this information to anyone in the Village as I feared that my discovery might be unnecessarily destabilising the highly-regarded Muang knowledge (but perhaps those in the city already knew). Nevertheless, this discovery shows that weather-society predictions supposedly based on astrological numerology, are also partly shaped by individual prophets' values, opinions and politics (see examples in Anderson 2005). In other words, Muang astrological knowledge was reinterpreted, re-contextualised and recirculated by 'local experts'; subjectivity plays an important role in predicting the weather, be it local or global, be it in the Muang almanac or climate models (Dessai et al. 2004; Miller 2004a; see Chapter 8 and 9).

Box 7. 1 The Making of Muang Almanac in Nan Province

The Thai solar-lunar almanac, used for predicting the welfare of society and environment, was originally calculated by traditional astrologers in central Thailand several centuries ago (Davis 1976). This ‘universal’ prediction was distributed countrywide to provincial temples for monks to redistribute them to lay people. In northern Thailand, abbots merged this centralized astrological numerology with the Muang cosmology with a slightly different numbering of the lunar months (Davis 1976, p.4). The Muang almanac then contained both ‘universal’ and ‘local’ predictions and reinterpretations. Today, as documented in Davis (1976) and Farrelly et al. (2011), most rural northern Thai households keep the almanac as a reminder of Buddhist holy days and in(auspicious days for planning activities.

In October 2014, I went to Chae Hang Temple, Nan province, to interview the abbot who according to the villagers made the Muang almanac. I was informed to my surprise that nobody at the temple did it. Instead, I was referred to an ex-politician of Democrat Party, Mr. Kamron. Everybody in Village M knew that he was the publisher of the almanac leaflets (see Figure 7.3, blue star). But, in fact, over the past two decades, Kamron was also the sole writer of the almanac, not the abbot.

About thirty years ago, Kamron, who was then a politician and a great supporter of Chae Hang temple, observed that the standard of wordings, astrology calculations and printing quality of the Chae Hang-made almanac were poor so he volunteered to help improve it. Kamron justified his mission as serving people’s need for predictions. He said:

Thai people like fortune telling. They want to know about health, prosperity and love.

...This is an agrarian society. Farmers want to know what to do or not to do when they use the almanac as a reference. And sometimes they believe

[Kamron 3]

He admitted that he didn’t have the intellect to *calculate* the solar-lunar dates, and therefore, his method was to *compile* five other almanacs, including the central almanac from Bangkok, combined with his own judgement in finalising the prediction. In order to preserve the sacredness of the almanac, Kamron attributed it the calculations upon which the almanac was based to the chief abbot of Chae Hang temple (see Figure 7.3, red star), although, according to him, they rarely consulted each other. Kamron believed his standards were very high because it was true to the original predictions from Bangkok.

For the content of the almanac, Kamron retained the originality of solar-lunar dates pre-calculated from the Bangkok almanac (because the calculation was universal). The less rigid but crucial parts were the ‘New Year’, ‘Rain and water forecast’, and ‘Food staple forecast’ sections (see Figure 7.3). Kamron used the Bangkok calculation as the main source, according to him, ‘slightly adjusted, with my own interpretation. Perhaps some were right and some were wrong’. When faced with conflicting information (because of different formula used in different sources), Kamron admitted he would write ‘there will be some gain and some losses’ to be on the safe side (see in Food staple forecast, Figure 7.3).

It should be emphasized that Kamron was an ex-politician of *Prachatiapat* (Democrat) Party, related to the conservative Yellow Shirt movement (Forsyth 2010; Rossi 2012). I hypothesize that Kamron’s engagement with the Muang almanac was a way of implicitly spreading the name of his party among the rural villagers of Nan, over half of whom tended to support the rival *Thai Rak Thai* Party and Red shirt movement (Rossi 2012). He said to me that ‘people know that I support *Prachatiapat*. I don’t care what others think. If they like me, they will keep the almanac’. Due to sensitive political issues during 2013-14 in Thailand, I didn’t pursue the relationship between political party and trust in Kamron’s almanac.

7.1.3 Rainy Season

The rainy season is about life and death, the long-awaited fulfilment of farmers' hopes, and the beginning of the life cycle of the field, in which farmers and non-human entities meet, merge and grow together. At the same time, there is the danger of rain and flooding. Memories of previous disasters and death are kept alive through the marks they left in the village.

Knowing the Rain 3: Meteorological Forecast and Direct Observation

The monsoon rain usually falls around the Muang Chang Lychee Festival, held during the first week of May [Pang 1590]. In 2014, it rained two days before the festival, followed by a further dry spell. According to the local belief, *Pak Pu Ya* plant (section 7.1.1) and the Muang almanac (section 7.1.2) had already indicated delayed rains and potential drought, respectively. To help monitor and prepare for a drought, villagers also actively tuned in to the meteorological forecast⁶⁹.

The quotes below show the weather forecast announcements made the unexpected rain in early December 2013 and in mid-November 2014, respectively, explainable and 'normal'. Note that Rin preferred scientific information to the almanac:

[CV] Is it strange to have rain this time of year?

Yes, this is strange. Normally it doesn't rain. But if the Meteorological Department had already reported then it is not strange

[Rin 372]

On the other hand, the weather forecast was for a large area, and did not provide a forecast local enough to be considered useful to local farmers. This is due to inherent coarse forecast resolution, which then created uncertainty about its geographical relevance. Rin [66] voiced her frustration: '[the weather forecast] said it's going to fall in Nan, but why can't it identify exactly which district is it?'. The forecast then had to be coupled with observation of local surroundings. In the passage below, it looked as if it wasn't going to rain, but then did:

In a group conversation during a lunch break from rice harvesting, mid-May:

Today the weather forecast said there is going to some rain covering 60% of Northern Thailand. This is higher than other regions [in Thailand]. But there is none in Nan province.

⁶⁹ The programme 'Fon Fa Agad' [Weather] from Channel 7 was particular popular because of its tailored contents to world affairs and humour.

But look at the sky, I'm not sure. Is it going to rain or not, I don't know. Or is it going to rain in other countries?

At 1.20 p.m.

Go! Let's go! Look, the towering cloud is coming! Look over there! It's dark already

[1779-1787]

Nonhuman rain indicators included: black ants relocating nests (few days); presence of frog calls and migrating birds (daily); and changing colours and directions of southerly wind/clouds over mountain ranges (minutes). Only lay insiders, through inhabiting and knowing the land, and not the almanac or weather forecasts predicted and produced by distant 'experts' can provide this kind of finely tuned forecast.

However, on the whole, the weather forecast can be of use to farmers, who happily combine it with the Muang almanac and personal observation. But because each person has different and biased levels of trust for each source of knowledge⁷⁰, the weather is an on-going topic of discussion on farmer networks, in and off the fields, as a way of updating knowledge and learning from the villagers like Mali, Mek, Jan and Pon. As shown in Orlove et al.'s (2010) study of farmers in Uganda, storytelling via seniors is an important part of knowledge dissemination in Village M.

Anxiety and Satisfaction

Late May 2014 was abnormally dry, and by early June, the rain still had not come. The 'bad' rain disrupted the usual maize and rice planting calendars, and many farmers were anxious, frustrated, even desperate. For Pon, this year was 'the record-breaking drought. It's bad enough to conduct the cat parade' (see Section 7.2.3) [2029]. Luckily, on Wednesday 11th June, the Department of Meteorology announced a storm was coming. The mood changed positively; people started to prepare the land for planting. On Friday evening, the 13th June, the sky was overcast. The community meeting was interrupted by shouting:

It's about to rain! [Pree 2059]

Now I get to plant maize! [shouted and smiled happily] [Pree 2061]

⁷⁰ For example: asked if it would rain, Jan looked up at the grey sky for less than three seconds, and confidently predicted it wouldn't rain [2208], based on Muang knowledge. In another instance, while Dang was panicking about a potential raincloud coming from afar, Fon instantly dismissed any chance of rain without even looking up to the sky, reasoning that 'it [the chance of rain] wasn't in the weather report' [3261]. Here, Fon, just like Sai, highly trusted the scientific forecast.

Now it's raining. Sabai [refreshing]. Haven't seen [the rain's] face for a long time.
Don't ever complain.

[Mali 2062]

If it rains the whole night, plus tomorrow then we better start preparing to move
our stuff. It might flood ... if it rains for three days we've had it!

[Lali 2063]

The first heavy rain lasted for 25 minutes. The farmers were all smiling and talking about what to plant. The rain dissolved anxieties about a possible drought [2051] to relief and satisfaction [2061], but also concerns about flooding [2063], based on past experience (see below).

Choosing the Planting Date

The rice planting date is primarily dictated by Muang belief and the almanac [Jan; Mali F698]; it must not be on 'inauspicious' dates. Before the 1980s, when rice farming was rain-fed, if there was a drought, farmers would pick an auspicious date and sow seeds on the dried soil anyway and wait for the rain [Mali F702-706]. In 2014, Saturday 14th June was chosen (see Figure 7.4). despite, Saturdays considered 'bad' days according to the almanac; planting crops on this day does not bring prosperity (Davis 1976, p.25). That year, the Saturday rule had been broken for practical reasons and to satisfy the villagers' need for rain. Bending rules to allow work to be undertaken on inauspicious days is common, as observed by Davis (1976; 1984). Jan the wise man found alternative explanations and would ask for forgiveness from the spirits and deities.



Figure 7. 4 Seed sowing on Saturday 14th June 2014. The rain was delayed by at least two weeks. The soil was still hard and broken. The standing man, Dam, is using a wooden rod to make depressions in the soil in which his wife scatters seeds. ‘Luckily it rained, otherwise my hand would hurt even more’ [Dam 2098].

In the past, strictly adhering to Muang cultural beliefs and conducts was key in providing mental security for promising crop productivity, and, as Mali put: ‘any adverse changes in weather could be dealt with later’ [F702-706]. In the present day, practicality, yield and efficiency in crop production had become more important, and so culture was made more flexible, with additional help from the weather forecast in choosing the planting date. At the same time, I do not have enough evidence to conclude that people of Village M had entirely forgotten their Muang culture. This issue is discussed further in Section 7.2.4.

Relations and Liveliness in the Rainy Season

By July, the rice field had sprung into life. Heavy rain, strong gusts, thunder and lightning became common. Through feeling the decrease in temperature, the smell of damp air, the sound of frog calls, the green hues of the fields, and the movements of

new life in the fields, the villagers' experience and knowledge adjusted to and merged with the liveliness of the nonhuman world to which the rain gave life:

[CV] what is special about rainy season?

Personally, there is plenty of food – a lot of food. Anything grows. Bamboo, mushroom, shellfish and frog. It is the period of food stocking. Farmers like this period. Plenty of food. And it is a period where everyone's trees are starting to recover and you feel cheerful. Oh, this one I planted, now it is lively and it's growing! You can see its young leaves.

[Ped, interview]

I like the rainy season. It is fun... it is lively. You just can't keep up with it even though you thought you planned well enough. Rain is about to come, I have to prepare the land, and what about the frogs and fish farm? It's overwhelming. You have to deal with everything. ...it looks like fun [from the outside] but for farmers we say 'Tuk kan'; it's fun but with heavy workload.

[Jai, interview]

The weather is always inextricably woven into human activities. During rice planting, people longed for the 'good' rain, characterised by a rare drizzle during the monsoon:

[The drizzle rain] is the weather for rice planting. Rain in the middle of *punsā* [Buddhist Lent], carrying young rice to plant about a month and a half into the monsoon.

In the past, with the [drizzle] rain, the buffalos liked it. More work got done. The weather was good.

[Ped 2381-83]

[The drizzle rain] was good! Cold and rained all day... we would unhurriedly plant rice. The buffalos liked it, people also liked it...It's revelling

[Mali/Tai F573-70]

In this memory, both buffalos and humans 'learn to be affected' (Hinchliffe et al. 2005; Latour 2004, p.205) by the same soothing drizzle rain that created revelling and a relaxing atmosphere for rice planting.

As I have shown throughout, actions take place in and create home. Below are responses from Po and Fa upon showing them a photograph of themselves planting rice in July:

I like the photos that look natural...clear [sky] and bright...

When I see them I feel happy? It's the things in the past that we have experienced. We didn't get stressed about them....it is beautiful.

[Po 2784]

I interpret Po's word 'natural' as 'familiar, homely livelihood'. Captured in the photograph was a practice that planted pride and identity into the familiar landscape and skyscape. This happy weather-world was opposite to the (temporary) evil sky of summer.

Fear

The rainy season is not all fun and laughter; it is also about life and death. Farmers want rain for the crop, but not thunderstorms [Nam 2508-09], because the associated wind, thunder and lightning disrupts routines, damages goods and claims lives [Hong 1721]. Getting drenched in heavy rain, Dang described as 'cold and painful' [2698], and scary:

[If] it rains and thunders, I get startled by the sound [Dang imitating the sound of thunder]. But the rain is cool and comfortable. Normally by 4p.m. I'm home. I'm scared of lightning. Decades ago when I was still young, lightning sometimes killed buffalos

[Dang 3295-96]

Nam recalled how one afternoon in 1977, as people were rushing home, a strong wind destroyed the wooden suspension bridge of Nan River. Five people fell off and drowned [Nam 2543-44]. A concrete bridge has since replaced it.

Rin was especially scared of storms, lightning and thunder. She felt vulnerable, because she believed her house might not withstand the strong wind:

It's like there is a wind channel. If the wind blows into this channel, it gets stronger. Sometimes it blows towards my house, sometimes to the headman's house. The field is open, there's nothing to block it. It's scary, the wind. If it blows in the direction of my house, I have to flee to the headman's house. I'm really scared because I have my children too.

[Rin 2867]

As a mother, Rin worried about the safety of her family. Again, the role of gender features in weather perception. She also believed technological devices could increase the intensity of thunderstorms:

Since there were the telephone masts [2009-2010], I think the lighting and thunder got stronger...When the lightning struck, it stayed flashing over the telephone mast. It didn't go anywhere else. And when the wind came, it made a squeaky noise for a long time...

[Rin 2868]

During our conversations in October 2014, Rin also referred to a small storm in December 2013 that she and her nephew encountered for the first time in their lives:

I looked up and it was swirling like waterspout! All the leaves went up there. It was so strong. If we hadn't held on to a post we would have been blown away for sure.
[Rin 340]

Normally I'm scared of storms. I saw on the TV, it blew the whole house away! Since I was born I have never seen anything like this!
[Rin 341]

The impact of thunderstorms was felt both physically and emotionally, and Rin's story stood out whereas others did not express fear and anxiety at her level. It was the rumbling sounds and the force of the wind and thunder that caused fear. In addition, according to Ulrich Beck's (1992) idea of risk society in a modern society, mass media transmitted, made visible and dramatized technologically induced global catastrophic disasters to local places, thereby magnifying individual fear.

Flood Memory

There have been two major floods in Muang Chang, in 1963 and 2006, [Pon F231], categorised as 50-year floods. Pon remembers the two floods as exactly the same, rising to about waist level:

[The 2006 flood] was exactly the same as [the 1963 flood] because in 1963, the floor of my father-in-law's house [on stilt] was quite low [so it was flooded], and there he marked the flood level. Later, with his new house, we built the floor to be about 20 centimetres higher than the flood mark. In 2006 came the flood, but the water didn't go into his house. It was just about the marked level.

[Pon F217]

Flood level marks were incorporated into house design, which then became a permanent object and a geographical place on which the memory of the flood was anchored, unlike the 40 ha of rain, predicted in the 2006 Muang almanac, which remains abstract and placeless.

In August 2006, almost the entire province was flooded. In Village M, people had to evacuate their homes and sought refuge in the school building [Wan 2964]. It caused frustration and anxiety, but no lives were lost. Kob [133] was even happy because the flood left nutritious sediments on the rice.

Flood was also associated with abundance and fun:

[CV] During the 1963 flood, was it fun?

That time, I was about 10 or so. I stayed with my brother in his orchard at [a village]. At the time, it was flooded but we had a lot of fun.

[Pon F235]

It was fun. We didn't care about anything! We lost ourselves [Pree F236]

In 2006, it flooded at my house. There, it was fun catching fish. There were plenty of fish in the rice field. [My nephew] even got two catfish [laugh]
[Sai F237]

Floodwater disrupted the daily routine and delivered unexpected and exciting things such as a 'swimming pool' or fishing on one's doorstep. These positive perceptions about flood were often unreported, partly because many people believe that these benefits can be achieved by other means in other times, i.e. irrigation system, chemical fertilizers. Thus, the loss from flood outweighs its benefits. But overall, fear, frustration and happiness, as well as relocation, fishing, and floodwater marks, made up the experience of living with floods. For people of different ages, and different life experiences, these experiences were only made possible by the flood in the first place, and it is the emotions and practices associated with specific floods, such as the 2006 flood, that come to constitute personal and social memories (Hall & Endfield 2016; Krause 2013).

7.1.4 Experiencing and Knowing Changes in Weather and Seasons

Knowing and Feeling the Weather and Seasons

I have shown that weather and seasons were felt, remembered, and co-constituted in Village M farmers' daily lives and identities. Their weather knowledge emerged from anchoring weather memories and expectations to socio-cultural-natural assemblages. It is impossible to separate feelings in weather from knowledge about weather. People live and learn culturally, in the cycle of weather and seasons. These are summarised in Figure 7.5.

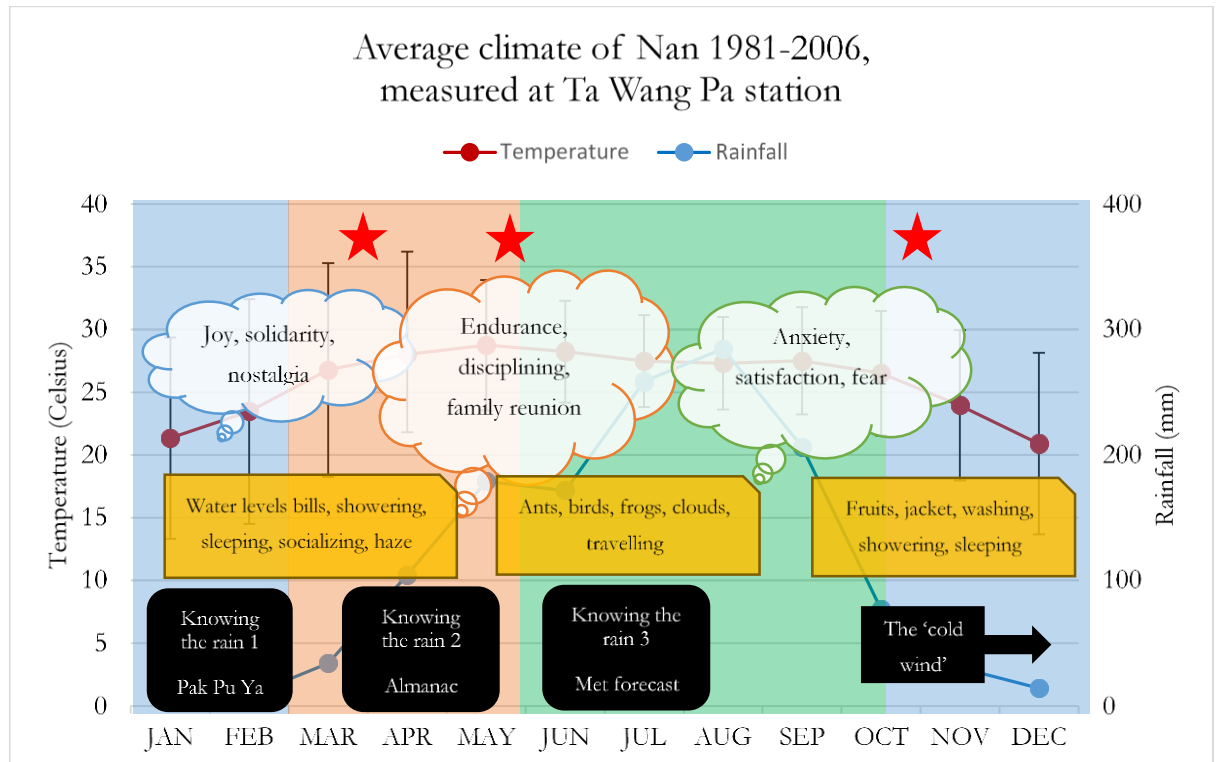


Figure 7. 5 Knowing the weather: in the background is a climate graph (from Chapter 5, Figure 5.4), showing average temperature and rain in the past 30 years.

In Figure 7.5, the three shades on the graph (blue, orange, green) represent the official onset of the three seasons in 2014 (Summer = 28/2/2014, Rainy season = 27/5/2014; Winter = 14/10/2014), announced by the Thai Department of Meteorology. The red stars represent the times in 2014 when people expect the seasons to start. For example, people expected summer to start in late March, but it came earlier than expected, at the end of February. The thinking clouds represent emotions and feelings associated with each season. Expectations of weather are informed by those in the yellow and black boxes. In the yellow boxes are indicators used to judge the performance of each season. These are social, cultural and natural cues that can be observed and experienced locally. In the black boxes are key indicators and forecasters of the onset of each season, corresponding to the subheadings 'Knowing the rain', and drawn from local, cultural and scientific knowledges.

As the winter of 2013 approached, people doubted whether it would be as cold as remembered it being in childhood. Instead, it turned out to be colder than expected, made possible by a strange rain. People had to wear thick layers to protect them from

the cold breeze and were reluctant to touch the cold water. At the same time, the coldness reminded of solidarity and resilience that had got them through past difficulties in the cold periods. This season is thought of as a reward for the year's hard work. There in the fields, under the bright winter sky, they celebrated the rice harvest, each rice grain symbolising the identities that made up who they are.

As the cold spell dissipated, people noticed that drought and the heat arrived a few weeks earlier than expected (see the red stars in Figure 7.5), and they were anxious. Rivers dried up and utility bills correspondingly increased. The heat made people bad-tempered, and sleeping was uncomfortable. Amidst these concerns, the lychee growers were happy as at the abundance of fruit aided by the cold winter. But not for long: the lychee price plunged rapidly along with their profits. In summer, the burning pain on their bodies was a constant reminder of the farmer's lot. Summer taught them to discipline their emotions, to endure and be flexible to changes. Hazy skies revealed a clash of identities, the forest protectors versus the forest destroyers. Temporarily, the open skyscape was disentangled from the Muang landscape.

Informed by *Pak Pu Ya*, the Muang almanac and weather forecasts, farmers were warned about the delayed onset of rain; they became frustrated and distressed. They actively tuned in to weather news and observed the behaviours of plants and animals for any hopeful signs. When the two-week-delayed rain finally came, people smiled. In the rainy season, humans, plants and animals come alive; they grow together and into each other. At the same time, people lived and relived the impact of storms, lightnings and floods that made marks in their memories, in objects and places in the village. This season teaches about the cycle of life and death. As every year, faces facing the earth and backs facing the sky, the farmers started planting the rice and their identity into the soil to be harvested in winter.

Muang people from Village M know *their* three seasons personally through binding cultural beliefs, identities and tasks with the weather, nonhumans, objects, times and places, hence forming the intimate weather-world of Muang Chang. These socio-natural assemblages become agents affecting how people interpret and feel about the weather (Burnham et al. 2015; Jerstad 2014; Country et al. 2016; Krause 2013; Vannini et al. 2012). Each season becomes a physical resource for livelihoods and farming activities. As noted, sometimes the weather performed unexpectedly, and therefore emotions and activities were unsettled. But people sensorially attuned and adjusted to the fluctuating

flows of weather and seasons, by cultivating cultural weather resources that reminded them of the past and offered continuity into the future. There was no ending or beginning of seasons; there was only transitions to the next movement of life that constantly recurred to form the inseparable relationship between weather and culture (Hulme 2015a; Ingold 2010; Krause 2013). The workings of this relationship are written into the experiences of social life that can be traced from the landscape and skyline of Muang Chang (Ingold 2000).

Assimilating Different Sources of Knowledge

Weather and seasons were known relationally, and they were co-constituted and emerged together with different sources of knowledges, comprising horizontal and vertical types. The internal, horizontal type includes localised audible, visible and meaningful indicators like plants, animals, utility bills, and daily activities ‘whose rhythms are intertwined with the cycles of family and community life’ (Roncoli et al. 2002, p.422). These indicators inform the likely behaviour of weather in either a broad or specific way, and in a short or long timescale. For example, *Pak Pu Ya* and ant movements predicted the onset of rain on a monthly and daily timescale, respectively. As Heid Jerstad (2014, p.413) has written in great detail in the context of Nepalese farmers, it is the knowledge about the materiality of these mundane substances, behaviour and activities – harvesting in the sun, wearing clothes, eating, or falling ill, – in relation to the materiality of weather that allow people to understand the (risk) of weather, and this is what make it possible for people to manage livelihoods, social relationship and environment.

The second type of knowledge, the vertical one, is composed of predictive knowledge produced outside Village M, like the Muang almanac and scientific weather forecasts. Note that the former is regarded as internal traditional cultural knowledge, known and respected by Muang people, leaving the latter the only external and vertical knowledge. Compared to horizontal knowledge, vertical knowledge has higher perceived status and predictive power because of the sacredness, and the specialised form of knowledge possessed by the knowledge producers i.e. the abbot of Chae Hang temple (but see Box 7.1) and scientists from Bangkok, respectively. The villagers see themselves and their horizontal knowledge as ordinary, not as sacred as that of monks, and not as specialised as that of scientists. Vertical weather predictions are considered absolute, universal, authoritative and for some people, more trustworthy. While vertical knowledge

provides daily, short-term, and annual predictions similar to horizontal knowledge, the information of the former is abstract and impersonal (e.g. ha of rain and generic rain probability), meaning that the villagers need local surroundings to interpret and make sense of predictions (recall Pon's flood mark Section 7.1.3 p. 158).

While horizontal knowledge reconnects people to their places and histories, vertical knowledge allows villagers to anticipate the abstract futures informed by external experts. Overall, by finding a relationship between signs and events, and hence predicting an outcome, folk wisdom helps to make sense of (ir)regularities in weather and season (Jankovic 2001, p.130), and becomes part of 'a biological adaptation to changes in the environment with prognostic rules serving as a mental tools for survival' (Jankovic 2001, p.137).

Why and how are these sources combined? In studies of Victorian Britain weather prediction, Katherine Anderson (2005) and Vladimir Jankovic (2001) document the battle for authority and centrality between empirical (horizontal) and imperial (vertical) weather knowledges. However, studies in agrarian communities in developing countries show that farmers, who already possessed local weather intuition, didn't resist but were open and flexible to external sources of knowledge, especially meteorological forecasts via television and radio (Roncoli et al. 2002; Huber & Pedersen 1997; Orlove et al. 2010). It was partly to fill in gaps of existing traditional knowledge and practically enhance overall prediction. The plurality of sources of knowledge, or what Roncoli et al. (2002, p.424) called 'pragmatic flexibility', helped in close monitoring and evaluation of significant periods, such as the onset of rain shown in Section 7.1.3.

As I have shown, however, there were tensions about the authenticity and accessibility of the source of rain prediction between the younger and older generations of farmers in Nan. Limited data obtained on this suggests that while village elders may value the Muang almanac because of its cultural relevance: Muang knowledge produced by and for Muang people. For younger farmers, what matters is ease of access, accuracy and practicality of prediction, regardless of type and source of knowledge. As Anderson (2005) shows in her study, each source of knowledge is a medium where values, identity and culture of each group or class of people intersect. What the Muang data shows is that assimilating different sources of knowledge is not simply about improving accuracy of prediction but also about the politics of knowledge. While individuals may have their

preferred source of reference, at the community level, preserving Muang knowledge and conduct has greater priority.

In addition, from a cultural perspective, accuracy may not be the most important attribute. As noted so far in this chapter, and as documented in Roncoli et al. (2002)'s study of farmers in Burkina Faso, predictions were inconsistent, and yet there was no plan in place with which to cope with future weather changes or reassessment of previous prediction patterns. This is not about a lack of accurate knowledge about the world, but a default understanding of the world as an orderless cosmology, and an acknowledgement of human's incomplete knowledge about the world confined within (Muang) cultural and religious framings (Davis 1984, pp.78–79). Moreover, for believers of the nature-deity-human relationship, where deities produce weather and respond to human behaviours toward nature, changing weather conditions are 'systematically linked to social life and correlated with a code for proper conduct', and therefore create a 'moral space' (Huber & Pedersen 1997, p.588). Within the Muang culture, what is fundamental is not to ascertain if the weather has really changed or what will change exactly, but to ask what humans have done to upset deities or disrupt the regularity of the cosmos. The relationship between what I call the 'appropriateness' of the weather and morality is developed and discussed further in the next section.

7.2 The Muang Interpretation Of, And Responses To, Changing Weather Patterns

Humans can only live culturally with the climate, argues Hulme (2015a) and my data indeed shows the people of Village M continuously in relationship with their weather and three seasons, physically, emotionally, materially and morally. This is where the term 'climate' becomes significant. Here, climate is thought of not in terms of a physicality but 'an idea which mediates between human experience of ephemeral weather and the cultural ways of living which are animated by this experience' (Hulme 2015, p.3; see also Box 2.1). The idea of climate provides a cultural lens for ordering the chaotic weather into its places, and this creates expectations of the weather contingent to places, times, and activities (Hulme 2015a, p.3). Moreover, in Muang Buddhist-animist culture, which believes in an orderless cosmology and fatalism, and where social and moral orders extend to physical nature (Davis 1984), regularities and

changes of weather and seasons contain moral lessons (Huber & Pedersen 1997). Below, I explain the dyadic relationship (Hulme 2015a) between climate and Muang culture, which involves the agencies of humans, physical nature, and celestial beings.

In 7.2.1, I introduce the relevance of the Muang categorisation of weather as ‘good’ and ‘bad’ for understanding the moral dimension of climate changes. Sections 7.2.2 to 7.2.4 present three different perspectives – animist, Buddhist and moral – that people in Village M chose to explain and respond to negative weather changes.

7.2.1 ‘Good’, ‘Bad’ and the Appropriateness of the Weather

In studies on seasonality, written in the phenomenological style, seasons are task-oriented (Country et al. 2016; Ingold 2000; Jerstad 2014; Krause 2013). It is the co-existence and co-constitution of human and nonhuman things (farmers, rice seeds, rain, soil and farming equipment) at a particular point in time in the weather-world coupled with a particular season that allow for activities to emerge as a farmer inhabits the field. When the ‘right’ moment comes, memories, sensory awareness and concentration are heightened to perceive the environment with greatest sensitivity (Ingold 2011, pp.60–61). Both the activity, seasonality and their entanglements are personally felt and remembered, and the performed activity makes the farmer feel happy. In the case of rice seed sowing, for example, a delayed rain fails to make up the ‘right’ conditions for seed sowing. The farmer cannot complete the task, and feels anxious about the missed opportunity (Krause 2013, p.37) and consequences to their livelihood. Moreover, delayed rainfall can stir associated memories and emotions, as well as individual, social and place identities and practices that make up the weather-world (Vannini et al. 2012).

As with people in northern India (Gagné 2013), Ghana (Eguavoen 2013), Senegal (Tschakert 2007) and Sweden (Meze-Hausken 2007), for Nan people, judgements about the weather in terms of ‘good’ and ‘bad’ are bound up in their livelihoods. In the 1980s, ‘bad’ weather events, or what Davis call ‘omens of impending disaster’, were documented in Nan as being ‘natural events which occur outside their normal time of occurrence’, including ‘heavy fog at the wrong time of day or year, unseasonable heavy rains, trees blooming or bearing fruit out of season, and extreme heat or cold at the wrong time of year’ (Davis 1984, p.286). In non-Western beliefs, bipolar categorisations are often used to refer to broader changes in society and the environment, and in connection to deities and gods (Donner 2007). Studies in Buddhist countries like Tibet (Byg & Salick 2009; Huber & Pedersen 1997) and Sri Lanka (Weeratunge 2000) and a

Buddhist-animist community in northern Thailand (Davis 1984, pp.73, 78–79) show that explanations for misfortunes centred around immoral misconduct that upset deities and spirits, and/or disrupted the social and environmental order. By applying the concept of dirt as chaotic and dangerous (after Mary Douglas), these studies show that ‘bad’ weather (like external climate change) is viewed as a result of ‘bad’ social behaviour that has contaminated society; to restore balance the deities will need to be appeased, so that the weather becomes a powerful signifier of the condition of human-nature-deity relations.

As I show below, there were other ways of explaining ‘bad’ weather apart from connecting it to spirits and deities. But overall, the Muang’s fatalistic belief in ‘multiplicity of conflicting theories of causality’, argues Davis (1984, p.73), ‘takes responsibility for people’s welfare out of their own hands’, thereby decentres the power of human, puts them in a larger field of relations among other nonhumans and celestial beings, and effectively raises internal questioning of morality and social responsibility (Eguavoen 2013, p.17). The ‘right’, ‘good’ and ‘bad’ categorisations of the weather, or the ‘appropriateness’ of the weather, then, cannot be separated from physical, cultural and moral expectations of how the weather should perform (Hulme 2015a).

Changes in the physical climate can be inappropriate (bad) for human activities. But even with no actual changes in the weather, appropriateness can vary, because of the shifting socioeconomic and political contexts that shape landscape, practices and weather indicators, and hence weather perception (Burnham et al. 2015). For example, an assemblage of deforestation-maize-burning that is partly motivated by socioeconomic forces that shape certain values and practices, resulted in haze pollution in early summer, so that some people in Village M considered it inappropriate physically and morally (Section 7.1.2). Another assemblage like corporate or government-sponsored maize and rice seed varieties, which were developed to maximise yield with specific desired tastes, physiologies, and resistance to diseases and changing weather (Na Nan 2015), could blur the line between (natural) adaptability and appropriateness of crops to weather, and vice versa.

In Rin’s experiment, rice varieties such as ‘Rian Tong’, ‘Leaung On’, ‘Mali 105’ and ‘RD6 short’ were planted as a second crop between January and May, the dry season, in addition to the normal period at the end of May. But the rice yield was below average, as one would expect, because of the lack of natural rain. In the normally-dry dry season,

soil and cold temperature were inappropriate for the four rice varieties [Rin 557] despite being developed to be flexible to human desires. For Rin, the irrigated water was ‘unnatural’ for the rice [Rin 557]. Moreover, the suffocating evil sky (see Figure 7.2) replaced the friendly drizzle rain that farmers expected (see Section 7.1.3). In short, changes in cultural practices upset the way in which the performance of the weather was interpreted.

The examples above show that the weather is never stable materially, statistically, culturally, or psychologically (Hulme et al. 2009). The idea of appropriateness points to a larger picture of agency in which the sociocultural and environmental world emerges from the interplay between atmospheric materiality and cultural responses to such changes (Hulme 2015a, pp.6–7). Below are three interrelated modes of interpreting and responding to (in)appropriate weather conditions found in Village M. In the first perspective (7.2.2), through animism, misfortunes can be avoided by conducting rites. In the Buddhist perspective (7.2.3), changes occur naturally and people accept their unpredictable destinies. The third perspective (7.2.4) is about long-term change of human values and morality. It should be noted that one person may adopt one or more perspectives, and that they are not easily separated. Nevertheless, it is interesting to observe how each perspective teaches people to live with and to be responsible for the weather, making ‘inappropriate’ climate a personal and social problem, not an external, environmental problem (Hulme 2010b).

7.2.2 Animist and Muang Cosmology Perspective: Hope and Fear

In Muang culture, animism was the default belief system before the adoption of Buddhism (Davis 1984; Seeger 2014). The main feature of animism is the belief in powerful nonhumans at the interface between humans and physical nature. Inappropriate weather then requires appeasing the spirits and deities using ‘the correct application of ritual technology’ (Davis 1984, p.72) to put the weather ‘back in its place’ (Hulme 2015a, p.3) i.e. to make the weather appropriate for the Muang socio-cultural-environmental order. The following examples illustrate people’s dependence on celestial beings. These sentences were spoken by the participants themselves in moments or periods of time of unhappiness due to lack of rain, or gladness that it had not rained:

Even if there was some rain, but if it was delayed then we can’t plant our rice. It is up to *anumotana* [mercy] from the rain [Fa 262]

Please let it rain. Tevada, please help me [Nam 1041]

There is no water, no irrigation canal here [upland lychee orchard]. No trimming either. That's why our lychees are so small. Just have to wait for Tevada to pee from the sky. [Wan 2451]

Tomorrow I'm going to make offerings to Jao Tee [tutelary spirit] that helped to chase the rain away the other day. We were lucky that day.

[Nat 1789]

In theory, regular offerings paid to deities pre- and post- cropping should grant appropriate weather as reward. Met by temporarily inappropriate weather, farmers communicate informally and verbally with the deities and await a 'miracle', as illustrated in quotes [262], [1041] and [2451]. If it is the case that the rain resumes as expected or desired [1789], then offerings are made to express gratitude. Davis (1984) similarly observed that propitiatory rites seemed to be made after an appropriate weather appears in a crisis.

In times of severe and/or large-scale disaster that is out of human control, formal communal exorcist rites are needed (Davis 1984, p.102) to dispel undesirable powers (field exorcism) or make offerings. Rice disease and rat infestation (in rice fields), which last occurred almost two decades ago, requires a ritual called *Sangka*. The field was understood to be possessed by malevolent and evil spirits and needed Buddhist monks and ritual experts to chant them away and restore purity to the village [Mali, Mai Fa, F690-695].

The cat parade for rainmaking is another ritual. Though native to central and north-eastern Thai culture, not Muang culture (Demaine 1978), it has been conducted several times in Village 'S', a neighbouring village south of Village M, but not in Village M itself. Perhaps a non-Muang person brought this rite to Village S. Sai, who lives in Village S, told me that in 2006, a severe dry spell occurred, and people believed that the rainmaking rite was necessary. The parade involved a widow ritualist and four cage bearers with the cat inside. Water was thrown at the cat, a symbol of dryness, while the widow chanted to ask for rain, and people banged on drums to evoke deities. The parade followed the main road connecting Villages S and M, so that even M villagers joined in. After the rite was performed, the entire province was flooded, Sai asserted (see 7.1.3). In 2014, there was no cat parade despite the delayed rain. But in 2015, due to the worsening drought, Village S and another village performed the rite.

In Section 7.1.3, Pon mentioned about conducting the cat parade given the delayed rain in 2014 (see p.153). But when I asked Jan the wise man who oversees village rituals why the cat parade was not carried out in Village M, he replied curtly that ‘it wasn’t a religious conduct. It was only a belief or a faith’. Nor was the cat parade documented in Jan’s Muang ritual textbook; it was foreign to him. Could it ever be performed, I wondered? Another man told me that the village lacked a leader and relevant knowledge, and that people had no interest in doing it. This could be because people believed they could cope with the drought (see Section 7.2.3) but also suggests that the cat parade was an exclusive cultural innovation and required specific cultural resources, unlike the Buddhist *Sangkaha* rite which was shared across Muang culture.

Fluctuations in the weather, be they appropriate or inappropriate, are accepted by Muang people as natural but controlled by deities in the background. Propitiatory rites need to be performed regularly to appease the deities, and people passively wait for appropriate weather. Changes in the weather legitimise and reinforce the interdependent tripartite (nature-deity-human) relationship. On the other hand, a disaster requires proactive and *ad hoc* exorcist intervention in order to ask deities to help modify, but not to overcome, the physical nature, to restore the Muang socio-cultural-environmental order.

In addition to conducting rites, the appropriateness of the weather could be explained within a framework of cyclical ‘good’ and ‘bad’ ‘units of time, whose fatal quality dictates the outcome of activity’ (Davis 1976, p.18). Cyclical temporality is common in Hindu- and Buddhist-rooted cultures (Perrett 1999). A study finds that Sri Lankan people believe the present world is currently in the time of Kali Yuga, the age of vice, and so things can only get better because the ‘good’ age will return (Weeratunge 2000). Similarly, according to an old Muang saying, the weather performs in a cycle of three ‘good’ years and ‘three’ bad years⁷¹. Pon and Mali, for example, believed that 2012 onwards would be ‘good’ years, and would get better through to 2015 [F320]⁷². These

⁷¹ Examples of a very ‘good’ year saw flourishing of Tob mushroom (*Astraeus hygrometricus*) [F283], a significantly ‘bad’ year observed rat outbreak [F300 Mali; F305 Pon]. Note that each individual differently interpreted and constructed the rule based on their personal experiences of crop performance, specific place (and hence vulnerability) and memories, and there was always inconsistency and conflicting cycles of ‘good’ and ‘bad’ year.

⁷² This conflicted with Pon’s own word [2006] that June 2014 was the worst drought. It also conflicted with drought in June 2015, which extended to about the third week of June before it rained, and the

beliefs about ‘good’ and ‘bad’ cyclical years potentially override scientific explanations of climate oscillations, and Western discourse of irreversible climate-change in a linear timeframe (Tschakert 2007, pp.389–390). Responses to environmental change in the Muang-animist cosmology are characterised by fear and hope: people fear punishment, and hope for forgiveness and benevolence, from the supernatural. Humans are one with nature, but inferior to spirits and deities.

As Seeger (2014) noted in the context of Thai religion, animism started to fade with the incoming of Western science and knowledge and state control. As with the tree ordination in Village M (see Chapter 3, Section 3.3.2; Darlington 2003), in merging animism with Buddhism, the cat parade similarly has been used as cultural tool for coping mentally and physically with environmental change (Demaine 1978). In respectfully seeking to influence deities and nature, the rite helps maintain Muang beliefs and practices but at the same time, as shown below, competes with Buddhist notions of acceptance and endurance.

7.2.3 The Buddhist Perspective: Stoicism and Acceptance of Change

In Thai and Muang Buddhism, karma, the sum of one’s good deeds and bad deeds in current and previous lives, adds ‘a tone of personal and moral responsibility to ideas about one’s fate’ (Davis 1984, p.73). In my data gathering, the idea of karma as explanation for inappropriate weather was not mentioned (see Sai’s quote [3372] in Section 7.2.4, p.173). Instead, it was implicitly associated with Buddhist concepts of *Anicha* and *Plong*: since existence is impermanent, one should ‘let things go’, and not be concerned with change, whether material or emotional. This view was expressed by those who experienced the major floods and Tsunami in Thailand (Phanthuwongpakdee 2016; Seeger 2014).

Both appropriate weather (like the beneficially cold 2013-14 winter) and inappropriate weather are seen as ‘natural’:

August 2016 flood (Petcharoen 2016). The experiences of 2015 and 2016 were definitely worse than 2014, and was incompatible with Mali and Pon’s observed ‘good’ year.

[CV] what causes abnormal weather, is it because we disrespect the *pii* [spirit] and *tevada* [celestial being]?

No, there isn't a *pii* or *tevada* overseeing the rain. It isn't in my textbook. If it becomes drought, just leave it [to occur naturally]

[Jan, wise man 902]

It is not about misconduct or disrespect to spirits. But it is because it is natural. We have to accept it, whether it is drought, cold or heavy rain

[Wai 2904]

Acceptance of changes then lead to adjustments and living with nature according to their capacities. Quotes below epitomise Muang people's fatalism with regards to the weather:

[CV] what would people do if climate becomes abnormal?

People will live through it. We live according to what we have. If there is [good] weather then we would have money

[Po 3018]

We can't fight against nature. However, it will change, just let it change. I hear people say that there is going to be a world wipe-out [apocalypse]

[Wan 2952]

Words like 'live according to what we have' [3018], 'let it change' [2952] exemplify stoical acceptance: weather is to be endured, and hence the idiom '*lang su fa, na su din*', (Section 7.1.2, p.143).

These responses to environmental change reflect Muang people's understanding of the 'natural law' of Buddhism. Instead of overcoming the physical changes of nature, Buddhist teachings are about 'overcoming human's natural defilement' (Seeger 2014, p.62) – to overcome the desire to control nature. Therefore, practices which are about adjusting to, and protecting, the environment based on the 'ethic of happiness' occur naturally and wholeheartedly because humans are one with nature and do not attempt to control nature or the natural law (Seeger 2014, p.62). These are practices which reflect the inner truth of the human condition of being harmonious with nature (Seeger 2014, p.61), and which are deeper than the fear and hope based responses of animism.

But are beliefs and practices that are inward looking able to aid people to cope with large environmental change? According to Min, the village headman, and Mali, they have the capacity to live through adverse changes, as the following quotes from discussions on this topic illustrate:

[CV] How does drought affect your livelihood?

We adapted through it. If it's cold then they [government] will provide blankets. But even if it is a severe drought, we could live through it. With large flood, we didn't have so much problem...Our home is bountiful...Overall, it isn't at the level that we can't live. We have always lived along with them [changes and disasters] ...

Even when we had the rice blast disease, over here it wasn't that critical. It was just that we couldn't produce as much as we could. It wasn't like we couldn't harvest rice or we had no rice to eat at all. It did happen, but we recovered from it. And the officers from Department of Agriculture came and helped.

Drought, it happened, but wasn't at critical level.

[Min/Mali 3316-3320]

This perception of resilience coupled with a rather passive and/or limited anticipatory response could be due to a combination of stoicism and fatalism, as confirmed in the study of a north-eastern Thai community (Suthirat & Takashi 2013). Other reasons include the infrequency of natural disasters, sufficient internal resources and adequate help from external government and nongovernment organisations. Human and cultural factors also play a part. Kuruppu and Liverman (2011) found that, in Kiribati, the lack of new invention or new adaptive strategies against climatic hazard was due to overconfidence in an existing knowledge system. Similarly, this study also finds high confidence among some villagers (like Min and Mali) that existing traditional knowledge has worked in the past, and will be robust for dealing with future changes.

As noted in Chapters 3 and 6, a new strategy for coping with environmental change has emerged through the marriage of Buddhism with existing practices. Over the last decade this approach has been advocated by NGO Joko and a group of Nan Buddhist monks. For example, drawing from case studies specifically in Nan, Darlington (2014) and Santasombat (2008) argue that a practice such as crop diversification, based on concepts of integrated agriculture and Buddhist's 'natural law', helps reduce vulnerability, builds resilience and minimises socioeconomic and environmental injustice. Rather than inventing entirely new systems, crop diversification is a strategy that combines traditional farming techniques that have already worked in the past with added Buddhist principles to help change worldviews and value systems, and allow farmers to be part of, but not dependent on, the current market economy. Therefore, it is local people who initiate and take control of change, independently of top-down global climate governance (Darlington 2014). The continual transformation and expansion of these new Buddhist-inspired strategies in farmer networks and in

disseminating scientific knowledge about climate-change, could add to robustness in adapting to environmental change while at the same time reducing injustice and inequality imposed by the state and external institutions (Darlington 2014).

7.2.4 Moral Perspective: Re-evaluating Human Behaviour and Virtue

While in the first two perspectives weather changes are out of direct human control, the third perspective sees changes as very much manmade. In this perspective, arguably broader than the other two, people are urged to reflect on their own moral behaviour. Following the cat parade described above, Sai spoke against the rite, arguing that it was based on desire rather than need: ‘there was no need to ask for rain just for 50 people, if there is enough land and resource for growing crop...’ [Sai 3417]. For Sai, if humans learn to live harmoniously with nature, there would be no need to selfishly engineer nature:

[CV] What causes abnormal weather? Is it because of karma?

It is not about karma. I think it is because there are less trees and natural resources at the expense of development. In the past, there weren’t many buildings. Now...there is increasing population, it is all about material development but not moral development”

[Sai 3372]

[Referring to the cat parade at Village S] ...people are greedy and impatient. They rent too many pieces of land for farming and they want things to be done quickly. Their greed is too much. They want to plant on Monday and they want the rain to come on Tuesday. They use machines. The greed is endless.

For me, if it rains in June, I plant in June. If it rains in July, I plant in July. Other people want ‘me’ to come first then the rain to follow

[Sai 3412-5]

Because we disrespect Buddhism, we no longer care about the ‘good’ days and ‘bad’ days because we hurriedly want to plant maize. Morality in Village M is higher than other villages. Elsewhere people are selfish

[Vej 3194]

Both Sai and Vej criticise a society and agricultural system that forces people to detach themselves from traditional Muang culture and its respectful relationship with spirits and deities, and so become more greedy and selfish. Meanwhile, Pree beautifully captures the association between climate-change and society in talking about the changes he has seen in his lifetime:

Before, the forest was not destroyed. But now it is humans that destroy forest. In the past, we used knife for cutting grass, now it is technology [chainsaw]. Just like the weather, things change. If it wants to rain, it rains. Sometimes it doesn't come at all. [Pree 1644]

In the past, there was no 'lok ron' [global warming], [and now there is] just like the how the society changes. Now we have [monosodium glutamate], before we didn't. And we just eat it. Speaking of traditional dancing in the past, the women used to wear sarong, now they have skirts. We danced around the whole night just for pennies. Now it is expensive [to dance], time was up so fast

[Pree 3127]

For Pree, climate and society in Village M are bound up in each other, in a process of steady decline. The unpredictable weather and global warming are part of the process that has seen the erosion of traditional practices through increased use of technology. As reported in the Marshall Islands in the Pacific (Rudiak-Gould 2012), Papua New Guinea (Jacka 2009), Peru (Paerregaard 2013) and Tibet (Byg & Salick 2009), the imported terms of 'climate-change' and/or 'global warming' (see Section 7.1.2, Table 7.1, and Chapter 8, Table 8.2), remain untranslated and are used to explain inappropriate weather by attributing it to modern lifestyles and disrespect of deities. In short, the fault is indeed with humans who have disrupted the pre-existing harmonious relationship with their socio-environmental order.

As with animist and Buddhist perspectives, in the moral perspective, changes are seen as a mirror. But where the moral perspective differs from Muang-Buddhism is that it advocates more than just everyday adjustments according to one's means. It also differs from Muang-animism that attempts to influence the weather in order to maintain status quo and social order, since it requires not better adjustments to nature or more rituals but a return to the sociocultural order that originally gave rise to and maintained the Muang-Buddhist and animist perspectives:

Rain in the past 4-5 years has been very low. But one good thing here in our village is that we don't have theft. [Another] village has.

[Pang 1828]

[CV] If the future will not be cold, would you still find winter fun?

Of course, it would still be fun. Every day I live with brothers and sisters. The air [weather] isn't the most important thing.

[Pang 3305]

As Pang noted, it doesn't matter if the weather changes as long as social and cultural conduct, and identity are preserved. In the focus group, asked how 'good' weather could be restored, there was agreement that this would be achieved through preserving

traditional livelihoods and to be with nature [Fa, Mali, Sai and Rin F755-60], including putting an end to deforestation and use of chemicals. Thus, regaining the appropriate weather is a by-product of long-term change in the entire social system and the human values that inform it. The moral perspective is less about fixing the weather and more about resisting the culture of the present, and turning to the lost culture of the past. Inappropriate weather, then, helps the people of Village M to ‘rediscover the nature and practice of human virtue’ (Hulme 2014, p.304), and that is, according to Buddhism, to live harmoniously with nature.

7.2.5 Local Blame and Local Agency of Change

Climate-change, as an external discourse and assemblage (Head & Gibson 2012), is already having an influence on local interpretations of the weather and morality, especially in many developing countries as outlined in the above section. These examples have shed light on the discourse of blame and agency: are changes in weather normal, and who made it inappropriate? The general answer points towards local people themselves and/or their gods and deities, not greenhouse gases emitted by people around the world. This is similar to findings in Village M. Changes in the weather were expressed in terms of local surroundings as shown in Section 7.1.4. Similar to what Forsyth and Evans (2013) find in another subsistence farmer group in northern Thailand, people do not attempt to directly manage the weather but internalise positive and adverse weather changes as part of local livelihood resources, such as rice, fruit orchards, water and forest. My findings add that cultural and religious beliefs do have a role in resource management, and in stabilising the relationship between humans and nature.

In the first two perspectives, Muang-animism and Muang-Buddhism, changes in the weather are normal, and are part of livelihoods. From the animist perspective, humans co-exist by submitting themselves to the deities, regularly performing rituals, and asking the latter to minimise inappropriate weather. From the Buddhist perspective, humans co-exist with the weather by adapting themselves physically and mentally. These are continual and reactive adjustments to changes in the deities’ blessing and nature based on existing cultural and physical capacities. Seen through the belief in powerful celestial beings and impermanence, an inappropriate weather event is not directly caused by humans, but by physical changes in the local environment, or through village people disrespecting local deities or failing to adjust to the impact of local changes.

In all three perspectives, society and weather are inseparable. In the moral perspective, which is the broader and deeper of the three, negative changes in weather are explained by forces that destabilise the relationship between animist and Buddhist beliefs, and climate. These are, for example, internal moral corruption that results in inappropriate use of rituals, or external socioeconomic change like modernity, capitalism and materialism that penetrate the village and disrupt traditional beliefs and practices, being morally unacceptable and/or incompatible with the existing social order. Inappropriate weather, in effect, is less about nature, and is directly attributed to the morality of the villagers. As in the first two perspectives, a moral perspective requires humans to change, particularly in terms of their mental outlook.

I have shown three interrelated Muang interpretations of weather and morality: 1) hope in and fear of the supernatural 2) stoicism and acceptance of change, and 3) a nostalgic return to virtue. Inappropriate weather events, whether or not labelled as local or global problems, are seen by M villagers as local problems that require local solutions by local people. This is quite different from Western discourse that usually addresses climate-change as a global problem, caused by (often distant) humans, and requiring concerted global human action (Darlington 2014; Head & Gibson 2012; Hulme 2009). The Muang worldview teaches that there are other forces controlling the weather apart from humans, that is the spirits and deities. In addition, deep moral responses based on virtue and Buddhist harmony with nature place human values and power before international scientific knowledge or hierarchical Thai authority and policy (Darlington 2014; Seeger 2014).

7.3 Summary

7.3.1 The Weather-world of Morality

In this chapter, I have shown that the weather of Muang Change is always inextricably bound up with the way the people of Village M think, live and engage in daily activities. Through winter, summer and the rainy season, interpretation of, and adjustments and responses to, the changes in the weather emerge from the ways in which the weather is deeply encultured within the Muang-animist-Buddhist belief systems. Here, the idea of climate, the belief in spirits and deities in animism, and ideas of impermanence in Buddhism, helps to make sense of (ir)regularities of weather in society, and allows

people to live the weather culturally (Hulme 2015a). In this ‘dyadic climate-culture relationship’, climate becomes ‘cultured through symbolic interpretations...and through cultures humans become acclimatised to the physicality of weather...’ (Hulme 2015a, p.4).

In Section 7.1, I have shown how the weather-world (Ingold 2010) of Village M was made through inhabiting the fields and orchards, and engaging in farming activities. My ethnographic findings support Ingold’s argument that, because of Muang cultural beliefs, the weather and seasons are not external, inanimate, static objects outside of the human mind, and there is no separation between humans, landscape and the atmosphere (Ingold 2010). The villagers live in an open world, where themselves, their animals and plants, and their landscape ‘learn to be affected’ (Latour 2004) by the flows of weather and seasons i.e. that the weather-world is the medium for perception (Ingold 2005, p.102).

Changes in temperature, rainfall, wind strength, and the moods of each day and seasons result in variations in visual, audio, haptic experiences and emotions, and villagers perceive and feel the same atmosphere differently each day throughout their entire lives (Ingold 2005, p.101). Experiencing, knowing and becoming, then, are all related processes. The villagers know the arrival of each season by attending and reacting to the connectedness, movements and co-becoming of nonhuman things that constantly send messages to each other (Country et al. 2016; Krause 2013). In winter, time for rice harvesting, it is cold, and a time of celebration that imbue winter with both joy and nostalgia. In summer, it is unpleasantly hot, and it is through feeling the heat in relation to health and work rate that people learn to endure and face change with stoicism. In the refreshing but also sometimes ferocious wind and rain, people learn to take care of, and fear for life. In the village, the farmers’ weather-world and identity emerged from and were co-constituted by daily practices that were at once on the fields and in the sky (Ingold 2010, p.S122). Over time, weather and season constitute place and leave traces, whether in homes or in the fields. Place is where ‘ensemble of [weather] memories tied to experiences that have unfolded within’ (Vannini et al. 2012, p.373).

Going deeper than these physical qualities of the Muang weather-world to the intrinsic quality of what Huber and Peterson (1997) call a ‘moral space’, it is still possible to state that there are also different views about the weather, *culturally*. From Section 7.2, I find that because of the Muang-animism-Buddhism, what the weather does to people, and

what people do to the weather, have causes and consequences. But ‘appropriate’ and ‘inappropriate’ weather events are differently believed to be caused locally by natural processes, deities that mediate nature, or villagers themselves. These three ways of explaining changes in the weather are interrelated, with individuals adopting different combinations of the three perspectives, with differing emphases. For example, when the rain did not come at the expected time, Wan and Sai’s approach was to accept and wait for the rain, while Pon planned to pump water in and thought of conducting a cat parade for rainmaking. None of these suggest that inappropriate weather, climate-change or global warming are caused by agencies outside Thailand, let alone Nan province.

The phenomenology of the three seasons shows that the appropriateness of the weather is full of emotions, is value-laden, and far from morally neutral. ‘Appropriate’ and ‘inappropriate’ weather cause people to yearn for the past and rethink their present conduct, to remain calm and accept changes, and to respect, hope and fear the supernatural. These relations resonate with winters of nostalgia, summers of endurance and perseverance, and rainy seasons of birth and death. Overall, it is possible to say that the ways in which Muang people think about changes in their weather are based around broader ideas of *renewal*, *regularity* and *fluctuation*, which are within the framing of animist and Buddhist understanding about nature and life.

In its cyclical renewal, people are ever hopeful for the coming of better weather and a better world. Future expectations are expressed with reference to a golden past, and it is often the case that declining and contaminated society explains inappropriate weather is often linked to social decline and contamination. Deep social transformation is seen as achievable through reviving and renewing the Muang morality and virtue of the past that people yearn for, in order to go forward and face change. In the regularity of the weather, people come to expect the distinctions of the three seasons, as well as their different performances. They learn from Buddhism to adjust and adapt harmoniously, and persevere if the weather and season become extreme or unexpected. In the random fluctuations of the weather, people hope for appropriate weather events, and fear for inappropriate ones, believing that they might have upset the deities. Rites are performed to appease these deities, to indirectly and respectfully influence, but not to control, the local weather. This is unlike the large-scale climate engineering of the Western worldview.

These three perspectives of changes are deeply interrelated and intricately woven together to form a loose framework for perceiving and responding to the changing weather. They may not necessarily be specific to one particular season, and a person may prefer certain perspective(s) to another. Disagreements are to be expected and an understanding of the diverse cultural lenses in which changes in the weather are experienced, perceived and responded to is needed. At the same time, the diverse and sometimes incoherent perspectives in Village M can be understood from the shifting and complex Thai view of nature and the need for environmental protection over the last three decades. These complexities are a result of multiple, intertwining discourses and factors ranging from belief in deities, charismatic individual Buddhist monks, state intervention and Western-influence of environmentalism, science and technology, and modernity and globalisation (Seeger 2014, p.73).

For the people of Village M, change is normal and local, yet carries moral significance. Such change puts into question their relationship with nature, deities, and their mind and conduct, all of which are inherently inseparable, and which are lacking in the assumingly purified (Latour 1993) Western 'ecological space of quantified relationship' (Huber & Pedersen 1997, p.590). In a broader view, the idea of appropriateness of the weather helps to critically question the power and politics of Western ontology that adopts a priori separatism, and 'cut against the grain of common sense' (Jasanoff 2010). In this non-modern world (Latour 1993), like in Nan, the physical weather and its changes are inextricably enmeshed in culture and religion. Nonetheless, as shown in the next chapter, this particular ontology of the weather is barely acknowledged by organisations outside the village.

By no means my analysis attempts to generalise the sensational and emotional meanings for a particular season. It is true that each person holds different preferences for certain atmospheric conditions e.g. Nong disliked winter because of uncomfortable layers of clothes and Rin feared for lightnings. Similarly, rainy season could also be thought as nostalgia, or summer could be about happiness too. The point is that these are not as salient as the feelings and meanings that I ascribed in the two paragraphs above. The role of gender and weather perception also features implicitly here. Male farmers, for examples express temperature of any seasons in terms of the ability of their bodies to work in the field (see Table 7.1) more strongly than their female counterpart. This is partly because the former group is expected to perform well under any kind of weather.

Weather perceptions that are unique for female farmers are less clear as the only voice came from Rin. She tended to protect herself from heat in concern for beauty, and showed a motherly instinct to protect children from storms and lightning.

It should be noted also that given my closeness to some of the key informants who were the members of Joko's Farmer Field School (e.g. Sai, Rin, Po, Fa, Mali), the stories that were elicited were slightly biased toward their relatively strong interests in sustainable and moral agriculture than the rest of the participants. However, I did not encounter farmers who support commercial agriculture like those in Village S that Sai mentioned (Section 7.2.4 p.173).

7.3.2 Ways of Knowing

Both Hulme's (2015) climate-culture dyad, and Ingold's (2010) weather-world concepts aforementioned aim at destroying the nature-culture binary opposition. The authors put weather, climate and culture in a complex relationship, and as emergent of one another. These non-modern concepts also challenge our epistemology or ways of knowing the weather and its changes. My ethnographic data has shown that knowledge about the weather is primarily experiential (Ingold & Kurtilla 2000). Moreover, as Burnham et al. (2015) argue, changes in the weather are contextualised in shifting socio-natural assemblages that change practices, and affect how people perceive the weather (see Section 7.2.1). Therefore, weather observation was mediated by multiple sociocultural and environmental objects and conditions; hence villagers engaged in multiple interactions and multiple epistemologies (Burnham et al. 2015, p.24). These ranged from the behaviour of certain species of plants and animals, the rise and fall of the cost of utility bills, the changing colours and temperatures of water and sky, wearing particular clothes, and the list goes on. These indicators were also needed in reading the authoritative 'vertical' sources of knowledge i.e. the Muang almanac and scientific weather forecasts, to help make sense of such abstract information.

The Nan villagers demonstrated flexibility in combining different sources of knowledge, and were also open to new forms of knowledge. However, new terms like 'climate-change' or 'global warming', despite their visibility (Rudiak-Gould 2013) via the media, government and nongovernmental organisations in the past decade, are incompatible with existing interpretations of local people as shown above (see also Chapter 8, Section 8.2). Nonetheless, the scientific community can learn from such ethnographic and historical data, beyond differences in ontology and epistemology.

Section 7.1.2, for example, described farmers' observation and experience of the maximum temperature in summer of 40 degrees Celsius, and the sudden, unexpected December rain that significantly lowered the temperature and helped fruit trees to flower. Together with historical travel logs as noted in Chapter 3, Section 3.2.3 could contribute significantly to studying changes in climate and its impacts in places where weather instruments and climate modelling are lacking (Savo et al. 2016). The role of villagers and weather observation is also discussed in more detail in Chapter 8. As Popke (Popke 2015, p.5) suggests, climate change research should embrace methodological diversity and epistemological and ontological incommensurability.

Chapter 8: External Organisations and Local Climate-change Communication

The overall objective of this chapter is to trace how global scientific claims are introduced to the lives of local Thai people by examining the communication approaches of different organisations with a strong interest in climate-change issues. More specifically, I examine how the different organisation's objectives, activities and characteristics influence how climate-change issues are interpreted and re-framed, before they are disseminated to local communities. At this interface between global science and local knowledge, I also examine whether different kinds of climate knowledge claims might correspond to or conflict with villagers' linguistic and conceptual understanding of weather changes in relation to their agriculture livelihoods that I have introduced in Chapter 7.

This chapter contains three sections. In Section 8.1, I introduce 11 climate change organisations and two climate researcher individuals that I interviewed, explaining and justifying my selection method (8.1.1); their different objectives, activities and characteristics (8.1.2). Section 8.2, which is the main part of this chapter, concerns the practicality of climate knowledge communication with villagers. This is divided into three further subsections. In 8.2.1, I compare the language of weather-related terms used by organisations and by local Thai villagers. In 8.2.2, I examine the roles and practices of organisations called 'climate service providers' which use science as the main platform for communicating climate knowledge, and the 'climate policy facilitator' who attempts to link the global climate framework to local development policy. In 8.2.3, I present the 'climate story listener' who, on the other hand, prioritises local traditional knowledge and tailors climate science to fit local contexts. These two subsections reveal the impossibility of not using scientific terms in dissemination of climate knowledge, and hence linguistic difficulties with these terms which often conflict with native understandings of weather and climate. Finally, in Section 8.3, I summarise how climate change facts and ideas circulate at global and local levels, and how these are interpreted and re-framed for local people.

I argue that the idea of climate-change, as a universal and mobile knowledge, is culturally, linguistically and experientially different from the language of weather used

in everyday life. To make sense of climate-change in a Thai context, local people are taught to think differently, depending on the cultures, methods and goals of each group of organisations. The ‘translation’ of the global language of climate-change into Thai language of weather has been driven by political intentions and has met with different levels of resistance.

8.1 The Nature of Climate-change Organisations in Thailand

This section introduces characteristics of organisations and researchers in the context of their climate-related projects in Nan, Thailand and Southeast Asia. They were selected through snowball sampling to gain a wide range of perspectives, ranging from governmental, nongovernmental and academic organisations. I divide them into three groups: ‘climate service provider’, ‘climate policy facilitator’, and ‘climate story listener’. These characteristics correlate to their roles, objectives, activities, and the extent to which villagers are involved with the projects.

8.1.1 Introduction to the Selected Organisations and Interviewees

In answering Research Question 3, I have selected 11 organisations and two individual experts who have interests in climate change adaptation in Nan province, my study site, and other parts of Thailand and Southeast Asia. The details of how I chose these organisations are outlined in Chapter 4, Section 4.2.5. In short, I aimed to select representatives from governmental, non-governmental/non-profit and academic organisations that had brought climate knowledge claims into Nan province.

There were six government authorities and organisations (Agricultural Land Reform Office, Thai Meteorology Department, Nan Meteorological Office, Nan Municipality, Nan Office of Natural Resource and Environment, and Deutsche Gesellschaft für Internationale Zusammenarbeit), four non-government or non-profit organisations (Joko Learning Centre, The Regional Community Forestry Training Center for Asia and the Pacific, Mekong Adaptation and Resilience to Climate Change, and Thai Environment Institute), and one research or academic institution (Climate Change Knowledge Management). I also include the personal reflections of two Thai academic experts in the field of climate change adaptation.

Acronyms of the 11 organisations, and their representatives whom I interviewed, as well as the topics of interview are provided in Appendix E. The Table arranges organisations according to their levels of operation: provincial (Nan ALRO, Nan TMD, Nan MUN, Nan ONRE, JK, RECOFTC), national (TMD, TEI, CCKM, Researcher v1, Researcher v2) and international levels (GIZ, MARCC). For the rest of the thesis, I use the voice of anonymised interviewees to represent their respective organisations in general. To refer specifically to the dialogue of the interviewees, I use the acronym of an organisation followed by the reference of the quote in a square bracket. For example, MARCC v1's quote [i15] refers to specific quotes on page number 15 (number derived from MS word) spoken by the interviewee 1 from the organisation. The person numbers and the job positions of the interviewees are shown in the Table in Appendix E, fourth and fifth column.

The voices of two individual experts i.e. Researchers v1 and v2 could not represent the entire range of works and opinions of their respective organisations. For example, Researcher v2's work on adaptation in the agricultural sector was only one particular research area among many conducted in Chiang Mai University.

In addition to the organisation interviews, I also attended several climate change-related seminars/conferences (see Appendix G). Some of these events were also attended by organisations above. For example, most Nan-based organisations like JK and RECOFT attended the Forum 'Holistic Natural Resource Management' in November 2014. Attending these conferences and workshops, only as an audience without imposing status or opinions, allowed me to observe the perspective and influences of individuals and organisations.

It should be noted that I did not 'follow' organisation practitioners to their site of operations. Given the range of organisations, and the aim to get an overview in Thailand, I only interviewed representatives at their offices. The questions that I asked them were tailored according to their areas of expertise (see fifth column in Appendix E). The questions were divided into three broad groups: objectives and activities; the use of climate information; and communication techniques. Appendix F summarises core questions used for all organisations, and specific questions tailored for particular organisations and their area of interest.

8.1.2 Organisations' Objectives, Activities and Characteristics

While the focus of this part of the thesis is on organisations' approaches to climate communication and adaptation, it should be noted that, given the histories of these organisations, their overarching goals and range of projects are certainly broader. Their work includes environmental conservation, food security, poverty alleviation, greenhouse gas reduction, energy efficiency, and so on. Their activities are also influenced by other affiliated private and public originations and funding bodies such as multiple governmental and non-governmental international donors.

For each organisation, I describe their scope of interest, their funders, activities and characteristics. Below I arrange the 11 organisations into three groups based on their salient traits: 'climate service provider'; 'climate policy facilitator; and 'climate story listener'. In addition, based on my field observation of their projects, participation in these three groups between organisation staff and local villagers tended to be 'low', 'medium' and 'high', respectively. I examine this in more detail in Section 8.2.

As noted above, Researchers v1 and v2 could not be categorised in this subsection due to multi-strand nature of their work, including desk-based climate modelling and participatory climate adaptation research. Moreover, their work alone did not represent the entire range of climate change research studies of their respective institutions.

Climate Service Providers (TMD, Nan TMD, CCKM)

The three organisations, Thailand's Meteorological Department in Bangkok (TMD) and in Nan (Nan TMD) and the research institute CCKM, are put in this category because, coming from a scientific perspective, they collect raw weather data, and process and provide weather forecast services via media to the public for enhancing planning and risk reduction, rather than the actual on-site community adaptation. From the public's perspective, weather forecast announcements of TMD and Nan TMD can be accessed via television and radio; direct physical interaction between providers and receivers of information is therefore limited. Because weather data is collected with scientific instruments, with little or no input from local knowledge, I class them their participation with lay people as 'low'.

Recently, Thailand's TMD complied with the World Meteorological Organisation's Global Framework for Climate Services (GFCS)'s mission to disseminate climate information to stakeholders at subnational levels to enhance climate adaptation

process (Climatological Center 2016; TMD v1). TMD's new activity involves visiting different provinces of Thailand, in partnership with local meteorological offices (like Nan TMD), to provide short-, medium-, and long-range weather forecast to local users (Climatological Center 2014). As aforementioned, I asked for permission from TMD v1 to observe their visit at Na Sao village, Nan province in November 2014, (see Appendix G). Even though GFC's mission entails that TMD physically meet the public, the way the meeting was arranged confirmed that TMD and Nan TMD do not appreciate local weather experience and knowledge, putting them in the 'low participation' group, as we shall see in Section 8.2.1.

Due to TMD's limited forecast coverage, resolution, and number of weather stations, especially in remote areas, an independent collaboration between CCKM, GreenNet, Oxfam Thailand, and the Health Public Policy Foundation was set up in 2010 to fill this gap by installing auto-weather stations (AWS) in villages of Yasotorn and Chiang Mai provinces⁷³, north-eastern and northern Thailand, respectively. CCKM's machines send raw weather data back and forth to Bangkok to be processed and to provide weekly weather forecasts to villagers alongside the existing national forecast system. The weather information is given in the form of weather maps and mobile phone messages. At the time of my interview with CCKM, apart from multi-time workshops and providing the weekly forecast, CCKM hadn't included local weather knowledge in its weather forecasts, hence I classify its participation as 'medium'.

Climate Policy Facilitator (GIZ, Nan ONRE, Nan MUN, Nan ALRO)

The second group concerns an international cooperation between the German organisation GIZ and Nan local authorities Nan ONRE, Nan MUN and Nan ALRO, in facilitating and connecting global climate change policy to provincial level planning and development policy.

Nan ONRE is a provincial environmental office under the Ministry of Natural Resource and Environment; Nan MUN is Nan City Municipality administrative body, and Nan ALRO is an office under the Ministry of Agriculture and Cooperatives, designed for building capacity and managing sustainable land use for agriculture. The German governmental organisation Deutsche Gesellschaft für Internationale Zusammenarbeit, offers intergovernmental cooperation with different countries for

⁷³ Project later abandoned due to faulty machine.

sustainable development. Their funding and initiatives are driven solely by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. Within Thailand, GIZ specialises in facilitating climate change policy implementation. After assisting Thailand's Office of Natural Resource and Environmental Planning in drafting Thailand's Climate Change Master Plan, GIZ chose Nan as a pilot study for implementing the national policy, the aim being for Nan be an exemplar of a low carbon province (see Chapter 3, Section 3.3.3). Their climate strategies target six sectors: city planning and civic participation; water resource management; waste management; green industry; biodiversity.

In 2012, GIZ invited Nan public and private stakeholders to discuss the low carbon projects. There were three teams working together in a hierarchy. The first team was the GIZ team, including German and Thai staff based in Germany and Bangkok. They proposed climate strategies which stemmed from the Climate Master Plan, and provided financial and technical assistance for the following two teams to make decisions. The second team were provincial government decision makers e.g. Nan Office of Energy, Nan ONRE and Nan MUN. The third team involved decision makers and leaders at sub-district and village levels where climate strategies would be operated. Nan ALRO was not involved.

Initially, Nan local authorities didn't have projects or strategies substantially related to climate change. The arrival of GIZ provided an opportunity to re-frame and align GIZ's climate strategies to the local issues of deforestation, food insecurity, haze pollution and waste problems. This completed the policy facilitation between the top-down and bottom-up approaches. But from my observation in 2014, GIZ staff did not directly visit field sites in Nan. So, I categorised them as 'medium participation'.

Climate Story Listener (JK, RECOFTC, MARCC, TEI)

The remaining four organisations are JK, RECOFTC, MARCC and TEI, who each carried out participatory fieldwork in their respective communities. As we shall see in Section 8.2.2, their unique characteristics were multiple day and immersive visits, with two-way exchanges of weather stories and knowledges with villagers. This allowed for sharing and co-creating new knowledge, and therefore these activities are classed as 'high participation'.

Nan-based non-governmental organisations like Joko Learning Centre have been promoting sustainable agricultural practices in Nan and Village M on a weekly basis for over a decade. Later in 2010, they were joined by Nan ALRO. JK had also been sub-contracted to conduct agriculture projects with climate change-related aspects (see Chapter 3, Section 3.3.3). Between 2012 and 2014, climate-change education was gradually offered to villagers, and was made an official communication strategy in 2015, after I left the field. RECOFTC is an international non-governmental organisation focussing on community forestry in Asia. One of their offices is based in Pua district, the northern part of Nan. Their recent climate projects aim to build the resilience of highland ethnic minority communities in Pang Yang village (see for example Hemwan 2015). Both the work of JK and of RECOFTC were initially not driven by climate-change issues but by existing local issues such as food insecurity, poverty and land rights.

Two other NGOs are TEI and MARCC, whose climate-related projects have been conducted in other parts of Thailand and Southeast Asia. The former is a non-profit Thai organisation partnered with the Institute for Social and Environmental Transition (ISET), focussing on urban resilience to climate change in Chiang Rai and Hat Yai provinces, northern and southern Thailand, respectively. The latter organisation is funded by the United States Agency for International Development (USAID), implemented by an American company DAI Limited, focussing on identifying the impacts of climate change and building adaptive capacity in the Lower Mekong Basin. Interestingly, both organisations conducted their projects through subcontracts to other organisations such as Asian Cities Climate Change Resilience Network (ACCRN) (for TEI) and International Union for Conservation of Nature (IUCN) (for MARCC). Both organisation's work was similar to those of GIZ in terms of stakeholder consultancy. But, in addition to table discussions, they also conducted participatory workshops similar to those offered by JK and RECOFTC.

It can be seen that all 11 organisations bring different kinds of (weather and climate) knowledge claims into the lives of villagers. In Table 8.1, these organisations are grouped according to the nature of their climate project, and the degree of participation between the organisation's members of staff and local villagers. As noted in Table, I also use the words climate facts and ideas. Climate facts are scientific knowledge about physical changes of climate, usually presented in numbers and graphs. Climate ideas are interpretations of climate facts by and for particular ideologies and contexts, e.g. call

for fairness in development policy to meet new climate challenges. These two terms, facts and ideas, are equivalent to my use of ‘climate and its changes’ and ‘climate-change’ used in Box 2.1 in Chapter 2.

Table 8. 1 Organisation cultures and degree of participation with local communities

Organisation Characteristics	Organisations / Interviewees	Level of Participation		
		Low	Medium	High
Climate Service Provider <i>Technicians deliver climate ‘facts’</i>	TMD Nan TMD CCKM	• •	•	
Climate Policy Facilitator <i>Decision makers connect global climate ‘facts’ and ‘ideas’ to local development issues</i>	Nan ONRE Nan MUN GIZ Nan ALRO		• • • •	
Climate Story Listener <i>Organisation staff listen to climate ‘facts’ and ‘ideas’ from villagers</i>	JK RECOFTC TEI MARCC			• • • •
Climate Researcher <i>Researchers investigate climate ‘facts’ and ‘ideas’ in communities</i>	Researcher v1 Researcher v2			

8.2 Communicating Climate-change Adaptation: The Question of Information Claim, Language and Reception

Some organisations claim that increasing climate awareness and knowledge of the public helps people to make appropriate adaptation choices. But how has the scientific idea of climate-change travelled into and through Thailand? What and how do organisations communicate with people? How complicated and effective are lectures of facts compared to the sharing of stories? To answer these questions, I have drawn broadly on Clark Miller (2004b)’s concept of neo-colonialism and the ‘Empire’, and Jasanoff and Kim (2015)’s concept of ‘sociotechnical imaginaries’, as briefly outlined in Chapter 2, Section 2.2.4. The strength of this conceptual and analytical guideline can be seen when analysing the work of different organisations below.

Miller’s new form of colonialism is an emergence of global institutions that create a particular framing, and puts its self as the sole governor, of a society or nature. All

clients and subjects, whether in developed or developing countries are linked into systems and far-reaching networks of this institution, for example the United Nation or the IPCC, through constant performative (re)construction of its values, standardization and ordering of knowledge. To understand how the power and authority of this 'Empire' is produced and maintained, Miller encourages investigating the 'growing arrays of public and private, formal and informal institutions of scientific, technical and technological production and harmonization that lie outside the UN' (Miller 2004b, p.81).

While a global institution may seek to singly define the world, Jasanoff (2015) recognises the diverse 'sociotechnical imaginaries', or 'collectively held and performed visions of desirable futures', that may exist even within a single nation. Therefore, translating the idea of climate-change, a traveling idea from the West driven by the hegemony of science (Hulme 2011b; Orlove 2009; Weisser et al. 2013), to a local site may not be smooth. These frictions and resistances arise because, in the process of co-production, organisations such as TMD, GIZ and JK hold greater power and different imaginaries than the local Thai villagers (Jasanoff 2015). What follows is an attempt to uncover the intersections between global, Western knowledge and local, Thai knowledge. It does so by explaining how the language and conceptual ideas of climate-change were manoeuvred by the 11 organisations to serve their particular goals, and how such ideas were then re-interpreted in local Thai villagers' conceptualisation of everyday weather.

In Section 8.2.1, I introduce five Thai terms that were commonly used during climate-change communication practiced by organisations. Section 8.2.2 discusses four organisations, Nan TMD, TMD, CCKM and GIZ and their tendency to use science as the main communication platform, and the expectation that villagers will do the same. Section 8.2.3 focuses on organisations like JK, RECOFTC, TEI, and MARCC who see the value of both science and traditional knowledge, and attempt to merge them to make climate change meaningful locally. As I argue below, there are strong relationships between the purpose and outcome of a project, and the style of communication adopted. Still, during their communications, neither group were able to abandon scientific terms altogether.

It should be noted here that the organisations I focus on are reduced to eight out of the initial 11. Nan ALRO, Nan ONRE and Nan MUN are omitted from this section

because of insufficient detail on climate communication. The voices of the two researchers are included at times when relevant.

8.2.1 Thai Terms for Communicating Climate-change

Here, I introduce five Thai words that organisation members often used when talking about weather and climate to the public: air, weather, climate, climate-change, and global warming. In Table 8.2, I compare the English terms against official (dictionary form) technical and spoken Thai terms. For the rest of the thesis, I distinguish between the uses of these five terms using quotation marks. For example, the word weather without quotation marks is the one used in conventional English language. ‘Weather’ with quotation marks indicates the use of this word in Thai language and context.

As the table illustrates, the English words air and weather have multiple forms and meanings in Thai language, and can be used interchangeably. The Thai Royal Institute Dictionary (1999) defines ‘aagad’ as sky or space, and ‘din fa aagad’, as weather. In Thai vernacular, when talking about the weather, ‘aagad’ (air) or ‘fa fon/fon fa’ (weather) are used interchangeably. In contrast, ‘pumi aagad’ or ‘climate’, exists in most cases as a technical term, and is rarely used in vernacular despite containing the root word ‘aagad’. Hence, to talk about changes in ‘weather’ and/or ‘climate’, lay people would only say ‘aagad plien plang’ (air changes), and not ‘pumi aagad plien plang’. Neither would they use this lengthy technical term ‘karn plien plang sapab pumi aagad’ or climate-change. To shorten this word, henceforth, I use the acronym ‘KPPA’.

Table 8. 2 Comparison between the English, official and technical, and spoken Thai terms of air, weather, climate, climate change and global warming

English terms	Official and technical Thai terms, pronunciation and direct translation	Thai vernacular variations
Air	อากาศ <i>Aagad</i> Air; sky; weather ⁷⁴	Same as official term
Weather	ลมฟ้าอากาศ / ฝนฟ้าอากาศ / ดินฟ้าอากาศ / สภาพอากาศ Lom fa aagad ⁷⁵ / Fon fa aagad / Din fa aagad / Sapab aagad ⁷⁶ Wind-sky-air / Rain-sky-air / Earth-sky-air / Nature (of) air	Same as official terms, and: ฟ้าฝน / ฝนฟ้า Fa Fon / Fon Sky-rain / Rain-sky
Climate	ภูมิอากาศ <i>Pumi aagad</i> Geo-air	Very rarely used
Climate-change	การเปลี่ยนแปลงสภาพภูมิอากาศ <i>Karn plien plang sapab pumi aagad</i> Change (of) nature ⁷⁷ (of) Geo-air	อากาศเปลี่ยนแปลง <i>Aagad plien plang</i> Air changes
Global warming	ภาวะโลกร้อน <i>Pawa Lok Ron</i> State ⁷⁸ (of) World (being) Hot	โลกร้อน <i>Lok ron</i> World (being) Hot

As in the English context, the Thai phrase ‘*plien plang*’ (change) doesn’t specify the direction of change, unlike ‘global warming’. Still, the Thai term ‘global warming’ (*pawa lok ron*) exaggerates the degree of heat from warm to hot, and implicitly indicates a causal agency (see also Chapter 7, Section 7.1.2, Table 7.1). The prefix ‘*pawa*’ refers to

⁷⁴ Thai Royal Institute Dictionary (1999)

⁷⁵ Thai Royal Institute Dictionary of Geography (2006)

⁷⁶ Thai Meteorological Department (2015)

⁷⁷ ‘Sapab’ (สภาพ) is defined as ‘nature’ abstract : (the innate qualities of something (Royal Institute of Thailand 1999)

⁷⁸ ‘Pawa’ (ภาวะ) is defined as ‘state’ : a general being or a phenomenon of something, caused by someone’s action (Royal Institute of Thailand 1999).

the being of something that is externally engineered to happen (see footnotes 5 and 6). Hence ‘pawa lok ron’ implicitly indicates that the world is made to reach a hotter state. In contrast, for the Thai word ‘weather’ (sapab aagad), the prefix ‘sapab’ only refers to a general innate state or qualities of the something, with no indication of agency. The words ‘sapab aagad’, and especially ‘karn plien plang sapab pumi aagad’ (climate-change) implicitly accept and suggest that change is an inherent quality of these phenomena.

Comparing the Thai use of ‘global warming’ with ‘climate change’ in both official and vernacular terms, the former term strikes immediately as a phenomenon related specifically to large scale, temperature increases with a degree of (human) intentionality. The latter term is less indicative of agency, specificity and direction of change. What it suggests more is that the ‘rain’, ‘sky’ ‘wind’ and ‘earth’ are part and parcel of the ‘weather’, both in terms of physical atmospheric components, and of linguistic and cultural roots (see Chapter 7), i.e. changes in ‘climate’ are natural. Interestingly, these striking differences between ‘global warming’ and ‘climate change’ in Thai language context exactly matches with that found in the UK (Whitmarsh 2009), suggesting the global influence and dominance of media interpretations of scientific knowledge. In Section 8.2.3, I present the use of these two terms from organisation’s practitioner perspectives.

8.2.2 Maintaining Science as the Standard Platform for Communication (TMD, Nan TMD, CCKM, GIZ)

The projects and communication styles of the climate service providers and climate policy facilitators I encountered were highly scientific, involving formal and one-way interaction with participants (see 8.1.2). Both TMD and CCKM provided the richest scientific knowledge claims, but this resulted in contrasting responses from villagers: unresponsive (TMD) and enthusiastic reactions (CCKM). GIZ was the only one that focussed heavily on climate policy, and provide an example of the climate rhetoric of urgency and collective action.

TMD’s ‘Lecture’ at Nan

In this section, I focus on Thailand’s Meteorological Department’s visit to Na Sao village, Nan province in November 2014 in a presentation titled ‘Climate variability and

climate change: meteorological knowledge and application’ (Appendix G), following their compliance with WMO’s Global Framework for Climate Services. The senior researcher TMD v1 believed that medium term weather forecasts were essential for Thai villagers who ‘still lack access to data, so we reach them and provide charts for them’, especially to ‘educated’ and ‘commercial’ farmers who could benefit from weather data. The reason for choosing their target groups and sites in Nan was, however, undisclosed. Nan TMD only briefly mentioned their previous connections with the Na Sao village headman.

Two main themes from the presentation were raising awareness of climate change and introduction of three-month weather forecasts. It was presented in central Thai (official) dialect. The presenter from Bangkok started by explaining weather forecast terminologies, which quantify atmospheric phenomenon. He also compared how his feeling of heat conflicted with the definition of temperature. To illustrate the difference between subjective and objective interpretations of ‘hot days’, he pointed out how “‘hot weather” for people from Central Thailand is about 30-31 [degrees Celsius] while the standard [of “hot day” defined by Thailand Meteorological Department] says it is at 35.0-39.9’. The implication was that understanding the standardised quantity of the latter requires access to measuring equipment, to which villagers must conform.

On the topic of global warming, as the presenter showed a diagram of global energy budget, and a list of greenhouse gases, I jotted down the narration:

“Pawa Lok Ron” is when the earth receives sunlight, and one day there is an accumulation of greenhouse gases, the earth emits less energy. It gets warmer and the temperature rises. And we feel that the earth is hot...

...Greenhouse gases existed since ancient time. But we only became interested in just the past 10 years...

...Carbon dioxide was caused from use of fuel in industry, cars, and from burning the forest...

The presenter went on to explain El Niño, followed by climate change:

“Karn Plien Plang Sapab Pumi Aagad” is change in “aagad” [climate] in 10 years or over. If it changes, it changes permanently. Like “aagad” [climate] of an agricultural field, once it becomes a city, the “aagad” [climate] is of a different kind.

The narration was linguistically challenging. The presenter didn’t make a connection between ‘global warming’ and ‘climate change’ at all, as if they were completely

unrelated (see Whitmarsh 2009). The former word was associated with temperature and pollution caused by human activities. 'KPPA' was explained to be changes of air caused generally by natural processes like earth's orbit and volcanic eruption, and also human actions, without specifying where in Nan or who might be responsible. Interestingly, to explain 'KPPA', the presenter inevitably had to use the common word 'aagad', and it wasn't easy to distinguish these words from 'aagad ron' (hot weather) and 'pawa lok ron', all of which were indicative of changes and heat. Other technical terms mixed in Thai and English were frequently heard e.g. 'stratosphere', 'greenhouse gases', and 'sunspot'. In addition, graphic representations of greenhouse processes and depiction of the earth and space, were conceptually challenging.

In the second half of the presentation, the three-month weather forecast reported almost zero chance of rain between November 2014 and February 2015. This was not surprising to the villagers given that it was the dry season. It also predicted a potential drought in mid-2015. But these pure weather 'facts' were not meaningful because they were not related to farming. Hence, the audience had to ask at the end of the session: 'is it going to rain soon? Because I need to harvest rice' and 'this year the rubber tree latex is poor, is it due to the soil temperature?' Unfortunately, TMD team members were not specialised in agriculture and could only give crude answers. Another limitation of TMD's three-month forecast was that it involves calling the TMD branch in Bangkok, unlike daily weather forecasts which are readily available via television and radio.

Overall, TMD's two-hour 'lecture' was successful, according to TMD v1's previous comment, because they were able to provide 'essential' scientific vocabulary and 'charts', as well as registering Nan's climate as part of a global climate system. This reinforced the sole authority and power of science, and their characteristics as climate service provider. But from a villager's perspective, this lecture was much less successful, as they struggled to make sense of the abstract and quantified weather space and time (Huber & Pedersen 1997). The information was unrelated to local surroundings, farming, body comfort, or socioeconomic consequences (see Chapter 7); the villagers were reduced to mere recipients of scientific information (see the Ugandan case in Weisser et al. 2013).

CCKM's Auto Weather Station and Text Messages

My field work covered the first phase (2010-2013) and the start of second phase (2014-2016) of the Climate Change Knowledge Management's work, which focussed on providing weather forecasts based on an automatic weather station (AWS) to villagers of Yasotorn province in north-eastern Thailand. Each week, the villagers received mobile phone text messages which stated whether or not it would rain in a period of seven days ('yes/no' format). By 2014, medium-term forecast information was included, with two other types of messages: printed weather maps and monthly rainfall given in terms of standard deviation. A typical medium-term forecast message would say 'Rain for this month is lower than average'. 'Lower', as a technical term, means that rainfall is at least 20% lower than average. Villagers were trained to interpret the new communication formats and language for better-informed decision making. According to CCKM v1, the villagers displayed flexibility to these new materials and a positive learning curve, though they also found it difficult to make sense of the information compared to personal experiences, as CCKM v1 noted:

Yes, they were confused because each person had different definitions of what is higher and what is lower [than average]. We would then have to go to their places to communicate what kind of scale do we mean by higher and lower [CCKM v1 laughs].
[i19]

Following quote [i19], the diverse individual and collective weather interpretations had to be re-calibrated by the CCKM team to match the standardised definitions, similar to TMD's work. This in effect is climate reductionism, to homogenise heterogeneous subjectivities of weather knowledge (Hulme 2011b). Moreover, villagers didn't have a role in observing, producing or interpreting weather data at all. Instead, villagers were assigned to record, using their own observation, whether or not it rained each day, only to verify the forecast message. No local knowledge was included, partly because, according to CCKM v1, the organisation couldn't find a researcher to help 'validate local knowledge'. For Watson-Verran & Turnbull (1995, p.138), to validate local knowledge is to put it in the 'hegemony of Western rationality'. This meant that the presence of the AWS jeopardised verbal and sensual ways of knowing weather, and that the Yasotorn villagers were reduced to mere end users of digitised weather facts that were processed by computers in Bangkok. The outcome was similar to the case of Indian PRECIS climate modellers in Mahony and Hulme's study (2012).

While the Yasotorn villagers became more dependent on the service of a weather forecast, it was agreed that weather knowledge production and consumption should be more transparent in the second phase of the project (2014-2016). The villagers demanded to become interpreters of weather forecast maps and data, not just validators. Still, the data processing in Bangkok remained black boxed. In doing so, CCKM allowed lay people to train and collaborate with technical staff, including them in the chain of production:

For the project to be really useful, we have to reduce the middle process – the one where the middleman [technical staff] interpret data. If they [villagers] could see what's inside the organisation that they usually work with, that will be better. But we might have to train them how to interpret such data because, if you see from the first phase of the project, it lacks continuity. The villagers were keen. They want us to teach them - where to get data, how to read it. We are happy to help them.
[i21]

In the future, CCKM v1 was also hopeful that, with knowledge from training, greater access to internet and the availability of weather data, the enthusiastic north-eastern Thai villagers would be able to anticipate weather for agriculture planning, and become more self-reliant and resilient. Nevertheless, as discussed below in Section 8.2.3, Researcher v1 disagreed with this 'middleman' vision. More importantly, there remain questions about whether villagers would have to conform to the scientific communication platform alone, and whether traditional knowledge would be included. In addition, CCKM and their NGOs partners GreenNet and Oxfam Thailand, were planning (post-2015) to include community-based education programme to raise awareness on climate-change, especially in terms of the impact on the agricultural sector. In the future, this move could see CCKM evolving to become a 'climate story listener'. On the other hand, transparency and relocalisation of global knowledge (Miller 2004b) are something which Nan TMD and TMD completely ignored in their work.

The preference for installation of AWS at local sites to help smallholder farmers adapting to uncertain changes in climate has been expressed in many projects. Apart from CCKM, the likes of MARCC, TEI, Researcher v2 and another research group co-funded between Khon Kaen University and the Rice Department, Ministry of Agriculture and Cooperatives⁷⁹, have put AWS as one of the indicators for the success

⁷⁹ I attended their workshop in north-eastern Thailand entitled 'Strengthening farmer's adaptation to climate change in rainfed lowland rice system in northeast Thailand', see Appendix G.

of their projects. This shows the belief in the strength of technology, and the will to integrate. Researcher v2 recognised that farmers do know about changes in climate, but they have a different form of knowledge, a tacit knowledge. In his vision, this kind of empirical observation from practice-based knowledge needs to be documented and standardised in order to collaborate with the scientific information. But how far could different kinds of knowledge be integrated, and what is the role of local participants?, ask Klenk and Meehan (2015). This question is explored in Chapter 9.

The German-Thai Cooperation and Contentions

Unlike the previous organisations, the scope of German-Thai cooperation on climate communication was limited only to Nan decision makers. Findings below are based on my observations and interviews (2013-2014) and secondary data kindly provided by JK staff at GIZ's August and September 2012 meetings held in Nan. Two points emerged: the rhetoric of climate ignorance, and conceptual and political conflicts in environmental management.

Even though GIZ v1 and GIZ v2 confirmed that their organisation's role was a 'facilitator', their staff referred themselves to the public as 'the climate-change experts', thereby implicitly suggesting a pedagogic dimension to their role. This status of superior knowledge was also probably necessary for establishing trust and respect. When asked, the German project director GIZ v2 replied frankly and assertively to me that Thai people were 'not alert' to the issue of climate-change. Moreover, GIZ v1, a Thai project coordinator, believed that the issue needed to be revealed:

[The goal was], em, to make Nan people understand that, hey, there is this problem [of climate change] that exists in the world. I'm sorry, it's not that Nan people don't know anything, Bangkok people also don't know anything. This country doesn't know anything, really. We [Thai people] are really far away from international knowledge. And [Thai people] don't know that [Nan people] are facing this problem. We [GIZ team] then try to change the understanding that, ah, there is this problem, too. [i40]

This rhetoric of an ignorant public also coincided with one of GIZ's summary reports of the workshop, which stated that stakeholders in Nan were 'informed [by GIZ] the importance of responding to climate change problem that the Municipality had to face' (GIZ 2013, p.9). In effect, GIZ presented themselves as the sole agent that could reveal and solve climate chaos to the ignorant public. According to Rudiak-Gould (2013), this is 'constructive visibilism' i.e. that invisible climate-change was made visible to the lay

public by experts. Furthermore, the climate-human relationship was problematized as a moral challenge: as GIZ v1 put it, people were ‘living with problems but didn’t try to make anything better’ [i42-43], and failed to collectively undertake the problem seriously. GIZ’s input also provided a hopeful opportunity for Nan local authorities to reformulate existing local development policies by merging them with the national climate policy. In sum, GIZ were trying to fix the gaps in knowledge, moral responsibility and local development policies through implementing a global climate knowledge framework. But as I show below, the global problem was interpreted differently from what GIZ originally intended.

The August and September 2012 meetings hosted by the GIZ experts featured discussion on implementation of climate change strategies. In total, about 40 representatives of Nan stakeholders attended, including decision makers, civic societies, academics and NGOs (plus Nan ONRE, Nan MUN and JK). Citing the IPCC, EU Directives, German climate policy, and Thailand’s Climate Change Master Plan, the GIZ team encouraged Nan stakeholders to pursue a low carbon transition based on renewable energy, while recognising the need for adaptation against flooding, in urban but particularly agricultural areas. Between the second half of 2012 until mid-2014, Nan government officers of different departments were sent on a series of training and field visits to Germany. These steps were necessary to enlist the Nan counterpart into GIZ’s philosophy of, and networks for, responding to climate-change.

Nevertheless, there were underlying differences in the ways of understanding and approaching environmental management between the German and Nan sides. To some extent, successful projects in Bavaria, southern Germany, a region claimed to be of similar topography to Nan, proved difficult to digest in a Thai context. Reflecting on the workshops, GIZ v1 said:

[the Thai trainees had their certain] expectations, and knowledges. They had their ‘mind set’ and what to expect. They also thought [the German experts] would come with a Thai ‘mind set’, but they [the German experts] said something different...
[i42]

The Germans said many things which, frankly, Thai people were really shocked by
[i44]

The Nan counterparts were shocked because, for example, while they believed forests should be kept for biodiversity and protecting water resources, the Germans set aside

the forest for timber use. GIZ v1 also believed the Thai ‘mind set’ was narrow and was not open to what he called ‘international knowledge’, as seen in quote [i40]. He was pessimistic that GIZ’s project would be fruitful in the long run, given the vision and inertness of the Nan decision makers [i42] who were the ones that implemented the national climate policy.

After some discussions in the 2012 meetings, Nan MUN and Nan ONRE decided to recycle their existing projects under a new climate label by implementing a waste reduction and recycling project, as part of a bottom-up climate policy. This was totally unexpected, said GIZ v1, since, initially, reforestation and flood defence were seriously discussed as effective responses to climate change in Nan. Later, Nan ONRE v1 admitted to me that the waste project was the only achievable deliverable given the complicated operation procedures and internal politics.

Despite the resemblance in physical geographies between Bavaria and Nan, both sides found frictions and surprises in each other’s knowledge and decisions. In other words, the German travelling sociotechnical imaginations, or what Jasanoff (2015) defines as the long-term vision of what a society ought to be, aided by the work of GIZ, clashed with those of the Nan representatives. The German side expected the Nan team to conform to their authority and expertise, but operational, subjective and cultural barriers were unforeseen. Unlike Yasotorn villagers who were easily tamed by CCKM, the Nan decision makers resisted what Miller (2004) calls the ‘Empire’ of the German counterpart (see also Callon 1986; Wynne 1996). This wasn’t only because of knowledge and contextual barriers, but also because GIZ and the Office of Natural Resource and Environmental Planning’s lack of administrative, operational and financial power directly over Nan Municipality and other Departments. They could only facilitate, but could not alter, Nan’s visions and interpretations of the national climate policy.

Despite these drawbacks, GIZ v2 was ‘extremely pleased’ with the progress. In 2015 and beyond, following the German government’s new climate scheme, GIZ and Nan, newly allied to the Department of Energy, would pursue renewable energy and REDD+ projects. Making carbon, energy and forests accountable on paper would help to legitimise their import of German climate ideas and policies to Nan, thereby reproducing the Empire’s identity and practices, and likely reinforcing dominant expertise (Miller 2004; Livingstone 2010; Turnbull 2000). Yet, it remains to be seen

whether such activities would lead to compatibility with local development needs and additional mitigation and adaptation capacities. Indeed, this climate project was different from that of TMD and CCKM in that it involved future visions, expectations and practices that were initiated, and will continue to be shaped by, German and Thai governments' and Nan stakeholders' stances in the local and global affairs. As Jasanoff (2015) noted, because of unequal power relations and responsibilities, and different values, extensions of the travelling sociotechnical imaginaries, environmental knowledges and ways of governance into a new local site will likely face negotiation, friction and resistance.

8.2.3 Embracing Local Knowledge as an Alternative Means for Communication (JK, RECOFTC, TEI, MARCC)

In this section, I present approaches from climate story listeners JK, RECOFTC, TEI, and MARCC who have undertaken extra steps to make sure they achieve a two-way communication, unlike the approaches adopted by the first four organisations (see Section 8.1.2). The approach crosses the boundary between science-lay dichotomy, involving filtering and manoeuvring climate facts and ideas before passing them on to their recipients for specific political purposes (Eden 2010). The story listeners accepted local weather narratives as an alternative means of climate communication. For Researcher v1, the intersection between climate data and vernacular languages is crucial, and that the organisation's practitioners, not the lay public, should take the role of the 'middleman' in interpreting data, and communicating the filtered information to local people:

I think that practitioners, NGO and development people have some potential. We [academics] can train [the practitioners], not that they [the practitioners] train villagers. Let these guys communicate with communities [...] It is an illusion hoping that villagers will use internet and do this and that. That's just a dream. There needs to be the middleman acting as a catalyst.

In other words, Researcher v1 disagreed with CCKM v1's comment (Section 8.2.2 p.197) about training villagers to read weather data. For Researcher v1, it is unrealistic and beyond lay people's capacities. In his view, non-scientific communication platforms and voices should be allowed to emerge. This shared dialogue between local and scientific knowledges is needed for people to become cognitively, affectively and

politically engaged with issues of changes in weather and climate. But this is not straight forward.

In the first of the five subsections below, I present the typical climate adaptation frameworks which mainstreamed the climate change issue into local development policy. In the second, third and fourth subsections, I show a learning approach called ‘climate history’ used for eliciting community weather stories in native languages in exchange for narratives of global climate change. The fifth subsection describes how local government re-interpreted ‘global warming’ as local haze pollution.

Integrating Climate Impact and Vulnerability Assessment to Local Context

According to JK, RECOFIC, TEI, and MARCC, their steps in the participatory community-based adaptation project were: 1) analysing impacts and vulnerability based on climate projection; 2) sharing weather and climate change stories between team members and local people; and 3) drafting suitable adaptation measures and activities. This follows a typical predict-and-adapt approach (see Turner et al. 2003) which means there must be evidence of climate problems first, before communication processes begin. The rest of this chapter concerns only the first two steps.

Unlike those in Section 8.2.2 that objectively communicate climate ‘facts’, organisations like JK, TEI, MARCC and RECOFIC intentionally instil climate ‘ideas’ so that, according to the researcher [MARCC v1], ‘a community could use climate issues to apply to existing development plans’ [16-17]. For MARCC v1, Researcher v1 and Researcher v2, some forms of climate projections and scenarios are necessary, and are what distinguishes a climate project from a development project. MARCC v3 considered her project to be ‘unique’ because the rigorous scientific studies, based on their own climate modelling for the entire Lower Mekong Basin and a large network of field-based researchers, helped inform decision-making and formulate policies. Scientific evidence was needed to secure climate financing from USAID:

I see that this is the uniqueness of our project that we are quite proud of... [describing the climate downscaling method] ... we see ourselves as being strong in our background study that led to being able to identify these hotspots and ecozones

We have teams of experts from different countries, and for each sector like livestock and fisheries. And our report is also peer-reviewed...

[i31]

But for TEI v1, a senior researcher on urban resilience at Thailand's Environment Institute, climate projections may not be necessary. She sees the inherent uncertainty of climate projections as possibly impeding robust urban planning, and only viewed climate change as an additional problem on top of existing urbanisation issues [i24-25]. RECOFTC and JK also didn't use sophisticated climate projections; they emphasised empirical evidence of observable changes. JK v1 believes that Nan farmers have good first-hand knowledge of changes in weather, but little knowledge on scientific 'climate-change'. Hence, JK's aim was to add facts and ideas about 'Karn Plien Plang Sapab Pumi Aagad' (KPPA) in relation to farm-level practices in their projects. This climate adaptation framework prioritises people's livelihoods before the climate itself.

Weather Storytelling

In the second step of community-based adaptation, villagers in all age groups, men and women, were invited to tell stories about their weather in exchange for scientific explanations. This was an antithesis of the climate 'lecture' conducted by Nan TMD and TMD (see Section 8.2.2). RECOFTC, an NGO based in Nan, reasoned that IPCC's technical terms were too difficult and impersonal, hence there was a need to 'weave' climate science into daily life. The techniques RECOFTC and MARCC called 'Climate histories' and 'Climate stories', respectively⁸⁰, are broken into three smaller steps. First, organisation members asked villagers general questions about the weather. Second, they informed villagers about climate science and impacts. Third, villagers were asked to construct a picture of how global impacts affect local livelihoods. The account below only features the first two steps. According to RECOFTC v1:

We asked them to reflect on past events. First, how the rain and air [weather] have been. We didn't use the word "Karn Plien Plang Sapab Pumi Aagad" exactly but we used "Din Fa Aagad" that people are familiar with...Second, has "Aagad" got hotter or colder? Third has the season been the same?

All of these were meant to link changes within the community, then we gave them the external information – the science – what is happening in the moment, why is it like this. It's "Climate history" that we try to create here with the villagers, when we inform them that the global temperature is rising, what are the impacts at global level. Then we got them to reflect on how the changes have affected them. Basically, to get villagers to reflect on the signs or phenomena that indicate that "Sapab Aagad" has changed, and what are the impacts.

I think it is important for villagers to have scientific knowledge but it must be explained from the livelihoods they have experienced. We used the three

⁸⁰ These terms were spoken in English language during the interview.

parameters – rain, temperature and seasons – as a means to weave science stories with local stories [i50]

The key for weather story elicitation is the substitution of the term ‘KPPA’ with the language of changes in rain, temperature and seasons. Organisation staff [JK v1; RECOFT v1] might ask ‘has the rain pattern changed?’, ‘has winter got warmer?’, or ‘how many layers of clothes did you wear this winter?’

For this group of organisations, there is an appreciation of the affective qualities of weather memories and stories. They also showed a commitment to create reflexive and lasting engagement between science and local knowledge, which were clearly missing in the first four organisations.

‘Weather’ and ‘Climate’

This subsection concerns the second step of ‘climate history’, where organisation practitioners attempt to explain how the ‘raw’ weather stories elicited from villagers might be related to long-term changes in the global climate system. But before doing so, there were contrasting views about whether or not to separate ‘weather’ from ‘climate’ before explaining what climate-change is.

TEI and JK contended that good communication should allow free articulation of weather stories in local dialects with minimal interruption. Using simple terms like ‘aagad’ and ‘season’, they were able to build pictures of various kinds of changes in the surrounding environment, and easily link these with the term ‘aagad plien plang’ (changes in weather) or ‘KPPA’ (climate-change). This was clearly evidenced in JK’s workshops⁸¹ which I observed and my ethnography (see Chapter 7, Section 7.1.2, Table 7.1). The workshop paid much more attention to trying to understand people’s observations and conceptualisations of ‘change’ than explaining to villagers what climate-change was.

While RECOFTC and MARCC wanted to learn about local weather stories, they also asked people to learn about weather from a scientific perspective, too. In their

⁸¹ Joko’s Farmer School workshop on the topic of weather observation and climate change, held on 1st July 2014 at Joko Learning Centre, Muang Chang sub-district, Nan province. Attendees were rice farmers from seven northern Thai provinces. One of the aims was to understand how people defined ‘KPPA’ and ‘Pawa Lok Ron’. To get people to talk about ‘KPPA’, terms like ‘aagad’ (weather) and ‘season’ were used to elicit answers. The word ‘pumi aagad’ (climate) was not used at all. More detail is found in Chapter 7 Table 7.1.

approach, they couldn't avoid dissecting weather stories into distinct categories of 'weather' and 'climate' before explaining climate-change. Below, I provide an exclusive account of how MARCC established a teacher-student relationship with the Southeast Asian villagers in their climate education phase.

In exchange for local weather stories from north and north-eastern Thailand, Laos and Vietnam, staff of the Mekong project taught the villagers, as MARCC v2 put, 'like how teachers taught students', to learn the difference between the scientific terms weather (sapab aagad) and climate (pumi aagad)⁸² (see Table 8.1), and use them differently in daily conversation. This scientific separation was needed for appreciating climate as a long-term change, something which is missing in Thai and other non-Western conceptualisations of weather (Eguavoen 2013; Huber & Pedersen 1997; Tschakert 2007; Rudiak-Gould 2012). To help explain the differences in vocabulary, an American educational cartoon⁸³, along with drawings and games, was shown to Thai and Laotian villagers. But MARCC v1 and v2 admitted that the cartoon alone had limited success in Laos due to difficulties in understanding the metaphors and jokes.

MARCC's deliberate use of 'climate' conflicted with my personal experience and my fieldwork in Village M, where I found people tended to speak of 'weather' not 'climate' in both Muang and official Thai dialects. It leads to a question about what came first between spoken language as part of culture ('aagad' and 'fa fon/fon fa'), or language derived from a direct translation of Western terms. Miss Naruemon, a linguist at the Office of the Royal Society of Thailand confirmed to me that in the past, there was only one Thai term, 'lom fa aagad' (weather)⁸⁴. 'Pumi aagad' was translated from the Western

⁸² Northern and North-eastern Thai dialect share similar root to Laotian language. According to MARCC v2, both 'Sapab Aagad' and 'Pumi Aagad' were used in Thai and Laotian languages. But I argue that these are technical terms, and are direct translation of weather and climate, respectively. These are not vernacular words.

⁸³ 'Weather VS Climate (Thai subtitle)' (<https://www.youtube.com/watch?v=HQLcOSI9fds> Accessed 3rd March 2016). This was an educational cartoon portraying a fight between the Blue Weather and the Red Climate Mexican wrestlers. The fight was broken off by a third superhero who explained the close bond between the former two that make up long term climate change, despite their differences. The cartoon was used by MARCC, and was produced in collaboration between American-based institutions: Community Collaborative Rain, Hail and Snow Network (CoCoRaHS); National Science Foundation (NFS); and National Oceanic and Atmospheric Administration (NOAA).

⁸⁴ Below is direct quote from email exchange with Miss Naruemon Greepon, a senior professional level linguist at Office of the Royal Society, an institution which produces the Thai Royal Institute Dictionary:

In the past, Thai people used "Lom Fa Aagad" for calling both short term "Sapab Aagad" ["weather"] and "Pumi Aagad" ["climate"] without clear distinction. Since the establishment of the Meteorological Office [1906], "Sapab

term climate (Naruemon 2016: personal communication). A number of imported scientific terms were a result of establishment of Royal oceanography and meteorology colleges in Thailand since 1906, founded by a Thai prince who had been sent to study at a British naval college⁸⁵.

The credibility of Western science was crucial to USAID, the Mekong project funder. Indeed, this had a strong influence on MARCC's attempt to redefine Southeast Asian linguistic and conceptual understanding of weather, as Rudiak-Gould (2012, p.52) puts it:

to translate English 'climate' or 'weather' faithfully would entail the introduction into nature–culture conflating societies of an entirely new concept, one which excludes 'social' phenomena – a radically foreignizing, 'abusive' translation strategy, unlikely to resonate with locals.

Again, as with GIZ, for example, this was evidence of ideas of climate-change travelling under conditions of neo-colonialism (Miller 2004).

To summarise, there were two contrasting approaches to how the four organisations built an understanding of climate-change. JK and TEI's facilitative characteristic respected the authenticity of weather stories, and minimised contaminations from scientific terms in order to maintain local experiential familiarity. MARCC and RECOFTC did the same, but additionally wanted local participants to understand science, too. Accordingly, they had to separate the original weather stories into distinct categories of 'sapab aagad' and 'pumi aagad', in order to put local weather in the context of global climate system and highlight its long-term (in)stability. The second approach was effectively a step towards the scientisation of local weather knowledge. This new term of 'pumi aagad' offered by experts, transformed people's understanding of weather ontologically and experientially (Huber & Pedersen 1997; Miller 2004b, p.90). Local weather knowledge was elicited and documented by the organisations, and but later subsumed into global climate knowledge.

Aagad" was then referred according to the Western principle, which was to separate "Pumi Aagad" "(climate)" and "Lom Fa Aagad" "(weather)"

⁸⁵ His Royal Highness Prince Abhakara Kiartivongse, Prince of Chumphon, who graduated from a British naval College, was proclaimed "the Father of the Royal Thai Navy" (<http://irrigation.rid.go.th>) and the founder of Thai Meteorology (<http://www.tmd.go.th>), due to his immense contribution in bringing modern physical sciences to Thailand since in 1906.

‘Climate-change’ or ‘Global Warming’: Keeping It Simple or Complicated?

After eliciting weather stories, with or without breaking them down into ‘weather’ and ‘climate’ categories, all four organisations provided knowledge on global atmospheric change ‘Karn Plien Plang Sapab Pumi Aagad’ and ‘Pawa Lok Ron’ to help explain the causes of local changes and for enhancing adaptive capacity. As I show below, in this educational step, these terms are linguistically and culturally complex, and they challenged people’s understanding. Each term carries different but overlapping narratives, meaning that the choice of terms depends on the purpose of communication and target audience (Whitmarsh 2009). Apart from telling climate ‘facts’, climate ‘ideas’ can be used for interpreting local development goals, as well as for manoeuvring the politics of cause and blame. Climate narratives gradually become more abstract and complicated as organisations try to teach the entire spectrum of climate-change issues.

The four organisations agreed that ‘pawa lok ron’ and ‘KPPA’ convey different messages. My ethnographic fieldwork (Chapter 7, Section 7.1.2 and Table 7.1) also showed that whereas ‘lok ron’ triggered farmers’ conversations mostly about temperature, and the links between burning and deforestation, and recycling campaigns, ‘KPPA’ triggered conversations about extreme changes of all seasons (Rudiak-Gould 2012, p.52; Whitmarsh 2009). For these reasons, TEI v1 only used ‘KPPA’, believing the term was simpler and conceptually more familiar to personal experience and observations and that knowledge about greenhouse gases was not necessary:

‘Pawa Lok Ron’ causes climate change. But we are not interested in why it got hotter because we are not interested in mitigation or greenhouse gas emission. It’s too complicated. The academic people that we worked with would use ‘Lok Ron’. But ‘Karn Plien Plang Sapab Pumi Aagad’ isn’t just temperature. It includes extreme events and sea level rises.

[...] But global warming is easier to understand because it is hot! Especially when you ask during the summer.

[i72]

JK v1 and MARCC v2, found that using ‘KPPA’ had the disadvantage of being long, complex and unfamiliar wording and pronunciation, unlike the shorter, more memorable and mass media-dominated word ‘lok ron’. But as shown in TMD’s work (Section 8.2.1), explaining increased heat via greenhouse gas processes was very demanding for villagers. Still, despite believing that ‘KPPA’ was a more appropriate

term in terms of accuracy, JK and MARCC found substituting 'lok ron' for 'KPPA' or using both terms interchangeably improved their communications.

Another advantage of using 'KPPA' was its synergy with concepts of adaptation as part of long –term development. RECOFTC, MARCC and Researcher v1 believe it is essential that people understand technical terms correctly to help make sense of causes and solutions across spatial and temporal scales, and to avoid maladaptation. The project director [RECOFTC v1] said:

When it comes to climate change adaptation... [the confusion between weather and climate, and global warming and climate change] makes it difficult. It is about the future, 10-30 years on. It's difficult because they say ooh, it's too far. They don't even know what's going to change in the next five years. So, climate change adaptation from villagers' perspective is adapting to present situations. If there is a drought, they fix the drought, if there is a flood, they fix the flood. They don't look for long term measures for coping in 20 years' time. Climate change adaptation for villagers...it's not forward-looking [i50-51]

Following this, knowledge is crucial, practically and politically. Indeed, MARCC's knowledge-attitude-practice survey (Oranop-na-Ayuthaya 2015) claimed that by the end of their project, the level of concern and knowledge, and ability to identify appropriate adaptation strategies of their Southeast Asian villagers had almost doubled. However, there was no indication of how existing local weather knowledge was included in long-term development.

RECOFTC v1 also argued that increasing climate knowledge helped to protect the already marginalised ethnic minority villagers of the highland Pua district whose normal livelihood of shifting cultivation had been blamed for deforestation, but was now linked to 'global warming' (Agarwal & Narain 1991; see next subsection):

They [villagers] need to know the real reason that, in the entire world, who really damages the world. Otherwise those who use resources, like villagers fetch wood for households would say, hey, I cut trees and make the 'world hot' [Lok Ron]. But if they know the larger picture that it comes from economic or industrial sectors, and fossil fuel, it would make them feel that they are not the scapegoat, and that they are not the main actor. And if they know that forests or trees have natural mechanisms in sequestering CO₂, then it would make them think that, hey, they want to protect and plant more trees, or make use of perennial plants

[i49-50]

I witnessed RECOFTC's philosophy being used in a Forum titled 'Holistic Natural Resource Management' (see Appendix G), during which a representative of Pua village,

who worked with RECOFIC, delivered a speech saying that the villagers lived in harmony with nature, were not the cause of changes, and that their knowledge and practices could indicate changes in climate just as accurately as climate models. TEI, though very specifically to the adaptation projects I interviewed, only reluctantly touched on climate or carbon politics due to complications in communication, while these issues were almost absent in TMD and CCKM's work given that their organisational cultures focussed on passing on information rather than engaging in civic movement.

Although the terms, 'KPPA' and 'pawa lok ron' convey different but related messages, they also cannot exist without the other. To initiate a conversation and keep climate communication simple, using 'KPPA' as default is sufficient to raise awareness of observed and remembered local changes, regardless of human or natural causes. This 'KPPA' pathway then avoids any association with greenhouse gas processes while providing a lens for long-term community development as a solution. But to communicate the full spectrum of climate-change issues, especially explaining the recent increase in temperature by human activities and the politics of carbon emission, 'lok ron' may be additionally needed. As in the English language context, although global warming is more emotive and affective (Whitmarsh 2009, p.418), it demands more abstract and scientific explanation, and can be too complicated for lay villagers.

Haze Pollution and Global Warming: A Local Interpretation of the Global Problem

As shown in Chapter 7, Section 7.1.2 and Table 7.1, farmers promptly associated 'lok ron' specifically to crop residual burning and haze pollution during summertime. Their perception was strongly related to the Thai government's communication strategy that links local air pollution problems of northern Thailand to the global atmospheric problem. The discourse that 'biomass burning equals lok ron' definitely raised local awareness and concerns about pollution and heat, but also raised questions about agency, blame and solutions.

Here, I draw on my own observational data gathered at a conference co-hosted by the Office of Natural Resource and Environmental Planning (ONEP) and Thailand's Development and Research Institute (TDRI) for public hearing of short- and medium-term strategic action plan for Thailand's Climate Change Master Plan (see Appendix

G). The ONEP-TDRI conference invited all types of stakeholders: government, private and nongovernment organisations, academic institutions, and the general public. This conference was repeated in five regions of Thailand, and I attended the northern region conference held in Chiang Mai.

The morning session saw a series of keynote speeches by representatives from ONEP, Governor of Chiang Mai City, TDRI, and the Regional Environmental Office. The speech by Mr. Chana Pangpiboon, Vice Governor of Chiang Mai, particularly caught my attention as it linked changes in climate to haze pollution:

...There are two points about climate-change. One is that it is naturally caused [...] Second, climate-change is caused by human, human actions that caused changes in the environment and climate.

...I have spoken many times about the maize, haze and forest fire in Chiang Mai [...] Hundred thousands of plots of maize were planted by a famous corporate [...] The burning of maize stubble caused endless haze and forest fire and huge loss. These are human actions that have caused climate to change rapidly and have impact to all humans...

This speech showed that the local agricultural practice of biomass burning, which were acknowledged to be caused by a firm influencing local farmers' crop decision-making, had the ability to cause changes in the climate system, and in turn affect all humans. This was not the first time that climate-change or global warming had been framed as a manifestation of local environmental issues. Due to high concentrations of small particulate matter (PM10) caused by large-scale biomass burning in recent years (Dontree et al. 2014), Nan ONRE and Nan TMD devised a campaign in 2010 called 'Zero burning for mitigating global warming' (Songsiyon & Intathai 2010), and produced a communication package entitled 'No Burning, [helps to] Reduce Haze, Reduce Global warming' (จดเฝ้า ลดหมอกควัน ลดโลกร้อน) (Regional Environmental Office 2012). In March 2013, local communities responded as reported in Nan Nakorn newspaper: 'Nan campaigned for rice stubble incorporation into soil to reduce global warming' (Nan Nakorn 2013). As with GIZ's work, these were examples of constructive visibilism of climate-change (Rudiak-Gould 2013).

In the afternoon session of the conference, stakeholders were invited to choose and discuss suitable strategies for 1) reducing GHG and supporting low carbon emissions and 2) adapting to impacts of climate-change. Unsurprisingly, one of the most popular

strategies for climate mitigation was to reduce burning in the agricultural sector and the 3Rs (reduce, reuse, recycle), while adaptive strategies favoured community-based resource management. These proposed strategies for the northern context – waste-, forestry- and pollution-related activities – were similar to what were negotiated between GIZ and Nan decision makers (Section 8.2.2), and to some of the conclusions reached in the Forum ‘Holistic Natural Resource Management’ held in Nan (Appendix G).

Representatives from non-agricultural sectors mostly supported law enforcement of the zero-burning policy. However, an ethnic minority representative from a highland subsistence farming community of Chiang Rai province believed that the state overlooked many aspects of reality. He felt that ethnic groups and farmers were being generalized and blamed for contributing to local and global environmental problems. The traditional and the most cost-effective way of eliminating crop residue for farmers was burning (Dontree et al. 2014). But he feared that for the government to completely ban burning and provide impractical short-term solutions like incorporating stubble into soil or stop planting maize would only encourage heavy use of herbicide instead. Therefore, although the centralised zero burning might prevent air pollution and changes in climate as claimed, the use of herbicide was likely to cause tremendous soil and water pollution downstream.

The implication of the haze-global warming narrative was two-fold. First, this cause-and-effect statement of environmental crisis seems to be a simple, factual yet universal narrative (Forsyth & Walker 2008, pp.227–228). The local authority and policy communicators have used the ‘corroborative potential’ (Rudiak-Gould 2012, p.52) of ‘lok ron’ to attribute local, visible phenomena to global, invisible processes. A local burning problem makes the world or society (lok) hot (ron); it is a collective suffering of heat that requires social, cultural and moral change. For the government and city dwellers, this line of communication makes sense, and the cause and solution are graspable: ‘lok ron’ equals to burning, and the solution is simply no burning. In this case, foreign language terms and concepts from a different culture have been successfully imported, shortcutting the link between local and global problems, and providing a two-in-one solution.

Unfortunately this simple statement is another example of environmental crisis narratives in northern Thailand as documented in Forsyth and Walker (2008). The

distinctive features of such environmental crisis narratives are questionable (scientific) assumptions, selective representation and insensitivity to local complexity. In a study by Rudiak-Gould (2012), '*oktak majetoto*', or climate-change in Marshallese language, was an accidental and fortuitous translation that respected local worldviews while localising global problem and encouraging collective social change. In northern Thailand, the deliberate 'lok ron'—'no burning' narrative may have correctly identified farmers as the air polluters (Dontree et al. 2014), but other causal agents – the private seed corporates that subsidized farmers in the first place, and increased meat demand from the city that required maize as ingredient for animal feeds – happily escaped blame in this narrative.

The haze-global warming narrative rests on the underlying politicised binary oppositions of 'wild(er)ness' and 'civilised': upland-lowland; forest-city; farmers-townsfolk. The recent dominant discourse of ecological fragility and the desire for wilderness by the urbanised middleclass help to frame modern agricultural systems and modernisation of farmers' livelihoods as drivers of environmental degradation (Forsyth & Walker 2008, pp.229–230). As a result, farmers are blamed for killing the 'wild' forest and polluting the 'pristine' air and water in cities and downstream areas at local, regional and global levels. With impractical top-down solutions, and the lack of support for traditional knowledge, haze problem then continued, with much blame, frustration and inaction voiced by farmers. In short, the haze-global warming narrative is a repackaging of existing politicised land problem narratives, for example of 'deforestation' and 'monocrop', by adding a new local-global air problem narrative on top.

In the ONEP-TDRI conference, the adaptation group discussion recognized this injustice, and so proposed land-use zoning and community-based management as a medium for empowering and freeing people from state control. This was exactly the reason why RECOFT v1 needed his villagers to learn the science behind global warming and climate-change to be able to politically resist the government's blame discourse. Adopting the enemy's weapons (superstructure and superior scientific discourse and knowledge) and reinterpreting it in creative, flexible ways is not an uncommon form of 'insurrection of the subjugated knowledge', the knowledge that is disqualified or held inferior to science (Foucault 1980, pp.81–82). It has previously been observed among the subordinated peasant communities of Southeast Asia (Forsyth & Walker 2008; Santasombat 2008; Scott 1985). This case study shows that there were disagreements in ways of responding to the locally interpreted haze-global warming

problem in northern Thailand. Pursuing mitigation (reduce burning) or adaptation (community-based management) reflect different values, visions, and the social and political factors that co-produce the politicised environmental knowledge (Forsyth & Walker 2008).

8.3 Summary

In this chapter, I examined the cultures (Section 8.1) and practices of climate-change communication (Section 8.2) carried out by 11 climate organisations and two researchers with their respective Thai and Southeast Asian participants. The results are summarised in Table 8.2. The ultimate goal of their climate communication and education programmes should be to empower villagers so that they can appropriately formulate adaptation strategies and pursue robust adaptation to anticipated climate change. But as I have shown throughout the chapter, importing the global concepts and framework of climate change adaptation proved to be difficult because they were linguistically and culturally challenging, and climate-related development policies could be interpreted very differently at local sites. It should be noted also that none of the external organisations mentioned anything related to the agency of spirits or deities as shown in Chapter 7. They mostly focussed on the measurable materiality of weather changes (Orlove 2009). Below I discuss how organisations seek to gain authority, mobilise, extend and embed the knowledge and discourse of climate-change in Thailand.

Table 8. 3 Summary of Communication Approaches of Eight Organisations

Organisation Characteristics (see Table 8.1)	Organisation /Interviewees	Communication approaches					
		Expert status	Present facts	Communicate weather using 'rain', 'heat', 'season'	Separate weather stories to 'weather' and 'climate'	Communicate climate change using 'KPPA' ⁸⁶	Communicate climate change using 'KPPA' + 'Lok Ron' ⁸⁷
Climate service provider <i>Technicians deliver climate facts</i>	TMD	●	●	-	-	-	●
	Nan TMD	●	●	-	-	-	●
	CCKM	●	●	-	-		
Climate policy facilitator <i>Decision makers connect global climate facts and ideas to local development issues</i>	GIZ	●	●	-	-	●	-
Climate story listener <i>Organisational staff members listen to climate facts and ideas from villagers</i>	JK	-	●	●	No	-	●
	TEI	-	●	●	No	●	-
	RECOFTC	-	●	●	Yes	-	●
	MARCC	-	●	●	Yes	-	●
Climate researcher <i>Researchers investigate climate facts and ideas in communities</i>	Researcher v1						
	Researcher v2						

⁸⁶ Climate change, or 'Karn Plien Plang Sapab Pumi Aagad' in Thai language⁸⁷ Global warming in Thai language

8.3.1 Organisation Characteristics

I have divided the 11 organisations into three groups: ‘climate service providers’, ‘climate policy facilitators’ and ‘climate story listeners’. What are the roles and relationship of these organisations in relation to environmental governance, knowledge and local people? In short, they divide and bridge the global and local, expert and lay, and scientific and non-scientific knowledges.

Intergovernmental institutions such as the WMO and UNFCCC conceive the Earth’s climate as a single entity that needs global curation (Jasanoff 2010; Jasanoff & Martello 2004). Clark Miller (2004b) calls such global governance the ‘Empire’, something that is at the same time political, scientific, technological and social (2004b, p.81) and that reaches out to its imperial citizens as a new form of neo-colonialism (2004b, p.99). The three climate service providers, especially TMD and Nan TMD, mirror these characteristics, because their work complies with the Thai government and WMO’s Global Framework for Climate Service. The same could be argued for the first phase of the MARCC project.

These organisations all seek to mobilise global science to gain authority and knowledge (Livingstone 2010), to justify the need for deployment of their projects at local sites. They construct themselves as powerful organisations that are able to reveal to local participants that the (local) climate is chaotic and fragile, that people need a different way of knowing and managing it. Hence, villagers need to be taught and trained to think differently, and their knowledge treated as unscientific and traditional. As with Miller’s (2004b) study of weather forecast institutions in Peru, my data also shows that weather forecast messages, as well as scientific language and representation, have transformed people’s way of making sense of the weather. As for Hulme (2011b), I see this as a form of climate reductionism that replaces heterogeneous and imaginative place-based weather stories with a universal explanatory framework.

While the work of the Empire (climate service providers) continues to reinforce divides between global and local and scientific and non-scientific knowledge, climate policy facilitators and climate story listeners have the potential to bridge such binaries; in general, they tend to adopt heterogeneous knowledges that are outside science’s domain including lay knowledge, moral judgements and emotions, while modifying and/or critiquing scientific knowledge to suit their own political agenda (Eden 2010). As found

in the work of GIZ and Nan decision makers, and TEI, MARCC, JK and RECOFT, global problems were tailored to local issues, connecting with local weather stories and development goals. This effectively creates a new hybridized public space for the emergence of alternative knowledges and practices (Eden 2010).

8.3.2 Translation of Climate-change Language

The ultimate goals of these organisations were to communicate climate-change and adaptation discourses to local people in order to enhance adaptive capacity and improve livelihoods. But because of the dividing and bridging characteristics of the organisations described above, Mahony and Hulme (2012) and Weisser et al. (2013) argue that such global discourses should be thought of as traveling ideas that carry hidden power relations and hegemonic epistemic claims (Hulme 2011b). The mobility of climate ideas can then be analysed using Michel Callon's (1986) four moments of translation (problematization, interessement, enrolment and mobilisation), revealing how power relationships are constructed, sustained or destroyed in the networks between organisations, local participants, and other human and non-human objects.

In the first step of translating climate adaptation ideas, i.e. *problematization*, the organisations seek to identify the needs and the problems of their participants. Drawing from diverse sources of knowledge claims and experiences, all eight organisations had differently defined the vulnerability of their respective communities, allowing the latter to be a legitimate target for adaptation projects. At the core of their projects, climate education was believed to enhance adaptive capacity and long-term welfare, and hence the organisations sought to make themselves indispensable to villagers. For example, TMD's medium term forecasts and CCKM's auto-weather stations were made to be essential to commercial farmers who need to maintain profit; GIZ, JK RECOFT and TEI also 'introduced' the problems of climate-change to villagers and offered tailored local development projects.

In the second (*interessement*) and third (*enrolment*) steps of translation, each organisation defined their objectives, expectations and roles in relation to climate communication, and worked out arrangements needed to achieve successful communication and translation of such ideas. In the case of TMD, GIZ and MARCC, for example, the global climate was portrayed to be unstable beyond local people's ability to comprehend and anticipate change. Only through internationally recognised institutions, experts and tools such as WMO's Global Framework of Climate Service, the German Federal

Environment Ministry, and the sophisticated climate models of the MARCC team, could the climate be known, predicted and fixed. In order to achieve these arrangements, it was clear that different organisations needed tools for the standardisation of knowledge. The brief climate ‘lecture’ (TMD), the physical presence of the weather station (CCKM), and regular meetings, training and reports (GIZ) made sure that technocentric dominance at supranational levels penetrated into Thai villages to discipline people’s understandings of local weather in particular ways. The seemingly unrelated actors – international frameworks, experts, villagers and the changing weather and seasons – were reassembled at certain places and times, to make villagers think in the same way.

While the above organisations communicated climate science and policies with the expectations that the local participants would conform to their standardisation tools, climate story listeners TEI, JK, MARCC and RECOFT adopted a much more elaborate and participatory approach to climate communication to achieve long-lasting learning effects. Still, the ultimate goal was to educate and connect the global ‘KPPA’ and ‘pawa lok ron’ to local weather stories, which needed to be elicited first using ‘climate history’ techniques. TEI and JK tried to localise global climate impacts but with minimal technical terms to maintain conceptual and experiential familiarity. On the other hand, MARCC and RECOFT asked villagers to learn a new foreign ‘language’ by assigning weather stories to ‘aagad’ and ‘pumi aagad’ to allow the long-term impacts of ‘KPPA’ and ‘pawa lok ron’ to be comprehended from a more scientific perspective.

Despite the participatory nature of engagement between these organisation practitioners and local villagers, which aimed to distribute power equally as they proclaimed, it was in fact still scientific knowledge and language that imposed a hegemony over the villagers. Even if weather stories were elicited, they were done to conform to scientific terms – to be dissected and purified of subjectivities (Latour 1993). Just as in the climate lectures and AWS, the use of these technical terms (‘pumi aagad’, ‘KPPA’ and ‘pawa lok ron’) represented a scientisation of local knowledge, though at varying degrees depending on the desired outcome: for example, for simplicity in the communication process, or for understanding the politics of carbon emissions.

The arrangement of these standardisation tools at local sites was needed in order for global climate knowledge to be recognised and then embedded (Mahony & Hulme

2012; Weisser et al. 2013). But at the same time, they created an ordering and standardisation of local natures, society and subjectivities, turning them into mobile facts, or what Latour (1987) calls immutable mobiles. For example, local weather stories thus standardised could then be explained in the context of a global climate system, which in turn is used to shape national climate policy direction.

For the final step of translation, i.e. *mobilisation*, the organisations needed to ensure that spokespersons of various groups were able to represent their group without resistance. Many ongoing projects have successfully used scientific knowledge to register local knowledge as part of the global physical climate system (TMD, CCKM), knowledge (MARCC, RECOFT) and policy (GIZ). And while the physicality and ideas of climate were performed to demonstrate local vulnerability, the villagers also displayed their communities as conforming to the vulnerability defined by the projects, and that they grew accustomed to the new scientific tools, language and representations (weather maps and numbers) needed to improve adaptive capacity.

While villagers of Nan (TMD) and Yasotorn (CCKM) provinces were reduced to end-users of weather forecasts (Clark & Murdoch 1997; Mahony & Hulme 2012), the latter villagers subsequently demanded transparency from the black boxed project and wanted to take on the role of user-technicians. Villagers working with MARCC and RECOFT also found the new knowledge helpful in improving livelihoods and those of the latter group proudly represented their NGO's ideas as a political movement. On the other hand, Nan decision makers found operational, subjective and cultural barriers to the German-Thai implementation of climate strategies despite rounds of intense discussions. Although such resistance was recognised by GIZ, the project seemed to continue with tighter policing from the German team.

In Callon's (1986) conclusion, to translate is to displace, to express one's own language, and hence to establish oneself as a spokesperson that represents the entire view of the network. As illustrated in this chapter, the sociology of translation of climate-change knowledge is a process that in Nan Province resulted in subjective experiences of villagers' weather-worlds being displaced and reassembled into particular framings: mathematical and graphic representations (climate service providers), and linguistic translation (climate story listeners) of weather to 'pumi aagad', 'lok ron' and 'KPPA'; and construction of local weather as visible climate-change through local and national

policy (climate policy facilitator). The Government's simplified, but flawed, haze-global warming narrative is another example of such translation at work.

These are examples of the ongoing '*climatisation*' of knowledge, de-culturing processes (cf. Hulme 2008, p.9) which force diverse local weather knowledges into pre-defined and imported climatic categories. Villagers' weather knowledge is made to give way to global kinds of knowledge (Hulme 2010). Spokespersons like TMD, CCKM and GIZ (early phase) are examples of those who reproduce the authority and power of science, experts and global institutions, but who have paid insufficient attention to and respect for the geographically and culturally diverse local climate knowledges. But there are glimmers of hope as NGOs like JK and TEI, and RECOFT to a certain extent, continue to embrace the plurality and complexity of knowledges, cultures and climates, thereby endorsing incomplete, spectral and cosmopolitan kinds of knowledge (Hulme 2010a, p.563).

Chapter 9: Discussion and Conclusion

9.1 Summary of Findings

This thesis is written in response to the often underemphasised human and cultural dimension, especially in current climate adaptation studies (Adger et al. 2012; Brace & Geoghegan 2011; Hulme 2008; Jasanoff 2010; O'Brien 2011). In the context of agricultural livelihoods in northern Thailand, and emphasising on places, experiences, meanings and knowledges (Chapters 2 and 3), the goal of the thesis is, firstly, to provide a space for local voices and knowledge about the weather largely absent from discourse of climate-change. Its second aim is to reveal the spatialisation and governance of climate knowledge, including its language and communication strategies. In Box 2.2, I outline three research questions:

1. How do bodily and material farming practices create, express and challenge farmer's identity and place-making?
2. How do farmers observe, experience and remember weather changes, and how do they interpret and construct meanings of weather in relation to their everyday farming practices and place?
3. How are climate-change discourses circulated to agricultural communities, and how do they correspond to or hinder farming knowledge, identity and practices?

To answer research questions 1 and 2 (Chapters 6 and 7, respectively), I spent about 13 months from November 2013 in Village M, in Muang Chang sub-district, Phu Piang district of Nan province, Thailand, where I conducted an ethnographic study involving participant observations, photo-elicitation and a focus group with about 35 Tai Yuan villagers who were mostly subsistence farmers. For research question 3 (Chapter 8), I interviewed two climate researchers and representatives of 11 local, national and international climate-related organisations, as well as analysed their publication materials. The details and reflections of the methodology and methods are reported in Chapters 4 and 5.

I have shown in Chapters 3 and 6 that the sub-district of Muang Chang and its *Muang Changness*, was known and practiced by insiders and outsiders who had different ontologies, goals, and ways of interacting with the place. Muang Chang, a homely,

sacred and moral taskscape, is an intricately woven web of humans, their plants, supernatural beings, land and weather (Cloe & Jones 2001; Ingold 2000; Stenner et al. 2012). The sub-district emerges, and is formed, through mundane actions such as journeys between hills and valleys, the backbreaking bodily posture during rice farming, and worshipping the spirits. Muang Chang is also an experimental laboratory where the revival and re-learning of traditional knowledge and practices has become a political movement whose objective is to demonstrate to the state and other stakeholders that flexibility to local and global changes and food security are not mutually exclusive.

Findings from Chapter 7 show that the weather for farmers of Village M is known sensuously and relationally, and has grown culturally with variations in agrarian topographies, the animating forces of the recurring seasons, and the Muang cultural and religious beliefs (Brace & Geoghegan 2011; Ingold 2007; Lorimer 2006). The cold breeze of winter generates nostalgia for a past in which society and environment seem always better than the present. The burning pain of summer heat has trained them to persevere through the changes in weather. The refreshing but sometimes dangerous rainy season has taught people to have hope in and fear the divinities imbued with power to control the weather. Local plants, animals and objects, as well as the predictive knowledge contained in the Muang almanac and scientific weather forecasts are all used for making sense of the regularity and ‘appropriateness’ of the weather and season. Responding to inappropriate weather only requires an appreciation that changes are normal, and to respond with an intention – largely a moral one – to adjust mind and body, worship deities, and revive traditional beliefs and morality. Changes in the weather are believed to be local problems that required local solutions by local people, with explanations offered from cultural, religious and moral perspectives, before, and sometimes against, scientific weather accounts.

Chapter 8 shows three ways in which the global scientific climate-change knowledge and narratives were circulated via climate-related organisations into local sites in Thailand. Lay villagers who worked with organisations labelled ‘climate service providers’ learned climate facts and ideas in the reductionist forms of lectures, numbers and graphs. Those who worked with the ‘climate policy facilitators’ learned from attending climate policy-oriented meetings and trainings hosted by the Thai government officers and foreign experts. Those who worked with the ‘climate story listeners’ shared their local weather stories in an exchange with new scientific knowledge

and technical terms. Through the standardised tools of climate facts, numbers, technical terms, and policies, each group of organisations articulated different realities of climate, different narratives and different responses needed from their clients. Nevertheless, they conflicted with local villagers' ontology, epistemology and vernacular language of weather. A clear example was the government's simplified deforestation-maize-burning-haze narrative that has also blamed local farmers' practices for causing global climate problems.

In Section 9.2, I discuss three important themes to emerge from my interrogation: local weather knowledge; global climate knowledge; and knowledge pluralism and community-based adaptation. In 9.3, I explain the contribution of my work to current research, and in 9.4 I propose five directions of future work.

9.2 Discussion and Wider Insights

In the 2012 Special Issue 'Cultural Spaces of Climate' of *Climatic Change* journal, the editors Endfield and Morris wrote that the Issue 'draws on international expertise in order to identify ways to *re-particularise* climate change discourses, to explore the meaning of climate and weather for different groups at different points in time and to question the ontological status of climate' (2012, p.2) (*italics mine*). The articles in the Special Issue were written partly as a response to the need to reintroduce particularity to the contemporary climate and its changes that has been lost in the production of scientific climate knowledge and its narratives (Hulme 2008). More specifically, it is the cultural contexts of weather and climate attached to place that are traded in exchange of aggregated statistical data, which are then produced and made visible as 'climate change' (Hulme 2008; Rudiak-Gould 2012). As shown in Chapter 3, there are limited qualitative studies in Thailand that connect concepts of place, meaning and knowledge, but nevertheless they help provide some contribution to this call for re-particularisation.

In terms of view towards nature, the Northern Thai of Tai Yuan ethnicity (Davis 1984) and north-eastern Thai people (Suthirat & Takashi 2013) are categorised as having predominantly fatalistic worldview, largely due to their Buddhist-animist belief system (whereas central Thai are just Buddhist). Because they accept their destinies and 'let things go', responding to large-scale climatic risk, are likely to be passive and reactive approaches, argue Suthirat and Takashi (2013). The authors conclude that their fatalistic

worldview needed to be changed through education in order to effectively engage in climate mitigative and adaptative responses. Another study by Forsyth and Evans (2013) however, demonstrated otherwise that the weather variability and disaster are part of livelihood, and they have successfully responded autonomously to any threats to livelihood using their existing knowledge and practice.

Using an ethnographic study in a small village of Nan, my work concurs with that of Forsyth and Evans (2013) that M Villagers have already coped and adjusted their livelihoods to various kinds of changes, not necessarily only to climatic risks (see further discussion in Section 9.2.3). And I argued similarly to findings in the Special Issue that changes in weather and climate are contextualised in livelihoods and places that are also entangled within the dynamics of local and global processes (Brace & Geoghegan 2011; Endfield & Morris 2012). Unlike the de-cultured technical terms of ‘climate change’ which Nan villagers have only recently learned to use, their weather was known culturally and perceived holistically i.e. the physical dimension cannot be separated from the shifting cultural, social, natural, political conditions affect how one perceives the weather (Burnham et al. 2015; Hulme 2015a; Rice et al. 2015). These intrinsic qualities of the Muang weather, however, are not always documented during the process of knowledge translation at local sites conducted by various organisations, partly because of local knowledge’s perceived inferiority to scientific knowledge of climate change.

Below, I discuss my findings in five related sub-sections. In Section 9.2.1 I draw on lessons that can be learned from Village M of Nan that their perceptions and responses to changes in weather were based uniquely on their Muang belief system and worldviews. Despite the richness of the Muang weather-world, Section 9.2.2 shows that there were processes of differentiation and exclusion which might render it less credible and authoritative than, say, scientific knowledge. De-constructing these processes allows knowledge integration to proceed in a more democratic fashion, and I discuss this in terms of community-based adaptation and institutional reflexivity in Section 9.2.3. In Section 9.2.4, I examine the interplay between external knowledge and vernacular Thai vocabulary and their potential for better communication. Finally, in Section 9.2.5, I discuss representativeness of this kind of small-scale qualitative study and why it deserves attention.

9.2.1 Lessons from Village M

From the Muang perception of weather, there are five lessons that can be learned in terms of causal attribution, governability of climate, worldview and responses, agency and power, and cultural and emotional resources.

First is the cause of changes in climate, where, in the Muang culture, there is no final or one single explanation to a cause or event (Davis 1983). From the Muang-animist perspective, changes in climate are because of both supernatural beings and human agents. Contrastingly, the Muang-Buddhist perspective dictates that neither divinities nor humans are the cause; it is climate itself that naturally changes. From a humanistic moral perspective, changes in climate are due only to human agency. More importantly, in the Muang ontology, these indefinite explanations of changes in climate are understood through cultural lens as socionatural phenomenon, unlike that of the IPCC which only strictly attributes changes in climate to either human or natural causes. Muang believers understand physical nature as always directly and indirectly related to humans, physically, mentally, spiritually and morally. In other words, Muang culture cannot be purified (Latour 1993) from its surrounding environment.

Second, as argued in Hulme (2015b), the relationship between causes of change and climate itself has a significant bearing on how climate may or may not be governed, or whether it is governable. Many national governments, including that of Thailand, have framed changes of climate as something that needs to be fixed (ONEP 2012). However, Muang ontology is not about stabilising or governing climate. To elaborate: the purpose of the rituals performed, the adaptations made and the progressive social transformations that I witnessed were not aimed at stopping climate from changing. For example, performing rites were done only to influence a deity's blessing, not to directly stop inappropriate weather; bodies and minds were trained to accept weather fluctuations rather than control them. These responses were about acknowledging, internalising and maintaining an understanding of changes as explainable and normal. Instead of making the weather accountable and governable, Muang knowledge comes with moral lessons that reverse human exceptionalism and teaches humility toward nonhuman nature and supernatural beings (Davis 1984; Seeger 2014).

Third, my qualitative study shows how changes in weather and climate are deeply engrained in mundane activities such as showering, wearing clothes, sleeping, travelling,

gardening and farming, and so on. In a wider picture, the idea of climate performs a stabilising role (Hulme 2015a) in the overarching goal of achieving subsistence farming and food security while surviving the unstable market economy and volatile weather. Once climate changes or is destabilised, it stimulates creative cultural responses that bring in ‘the physical and the cultural, the material and the spiritual, into a new realignment’ (Hulme 2009, p.357). Such actions included tree ordination (Chapter 6), a rain-making cat parade and crop diversification (Chapter 7, Sections 7.2.2 and 7.2.3) that were based on, and which reflected, the multiple truth about their inner lives (hope, fear, virtue, perseverance), and what they wanted to achieve in life (adaptation, appeasement, transformation) (Hulme 2009, pp.357, 362–363). Weather and climate knowledges for these villagers in Nan, then, are place-based and culturally distinct. Because each person views the world differently, different ideas and disagreements within and between communities are to be expected, showing the reality of climate as multiple, just as much as are the human ideas about it.

Fourth, and following on from the previous point, the Muang ontology offers an opportunity to look beyond science of climate-change for ethical and moral solutions, something which the scientific community fails to do justice to (Jasanoff 2007; Leduc 2014). Darlington (2014)’s work for example, shows how, by using the Buddhist notion of living in harmony with nature, local monks and local NGOs in Nan province were able to help local farmers build resilience to injustice and changes in the socioeconomic conditions and the weather through tree ordination and crop diversification, while maintaining cultural and religious beliefs. These are thoughts and actions by local people, driven by intrinsic impulses towards the good life and virtuous behaviour (Hulme 2014) which are independent of climate-change narrative as a product of scientific knowledge and the Thai government (Darlington 2014; see also Forsyth and Evans 2012). Recognition of diversity and multiplicity of truth about climate, as well as messy and clumsy solutions (Verweij et al. 2006) in conjunction with those offered by some of the international climate institutions and national governments, will be key for achieving adaptation to changes in climate at local scale. I discuss this point and the previous one further below in context of community-based adaptation.

Fifth, beyond experts’ recommendations or technical solutions, Muang Chang’s weather-world (Ingold 2010) acts as an emotional and spiritual support, as illustrated by the quote below from one of this research’s participants. Asked for her thoughts

about the future of agriculture during the June drought, Sai, whose fruit trees were dying even though she had tried everything, had this to say:

I'm worried. I want to ask the earth and the sky what I can do to make Thailand better. On my last breath, I would like to ask the sky, the wind and the air to take [my soul] away peacefully

[Sai 1988]

In Sai's world, humans, spirits and deities, the earth and sky, the imagined and the material, are interconnected. As recalled in Chapter 6 (Section 6.1.3 p.121-22) and Chapter 7 (Section 7.1.2 p.142-143), the weather has taught Sai to be tough and this is woven into her morality and identity, as well as the resources she uses when planting her crops. The weather is part of Sai's body and mind and in turn, she is a part of a spiritual world that embraces earth and sky; a cohabitation not only in this life, but in the next.

The 'Tai Yuan villagers' perceptions of, and responses to, weather and climate are part and parcel of the unique Muang culture and religious belief as well as the shifting socionatural contexts and agricultural landscape in which they dwell. These complexities of weather and climate cannot simply be reduced to the question of either physical or moral causes, or either local or global knowledge, for example. In other words, there are multiple interactions and multiple ways of knowing that need to be respected and preserved. The next sub-sections discuss what happens when different kinds of knowledge meet, and how can they be integrated in a just manner.

9.2.2 When Knowledges Meet

Given that Thailand is in the non-Annex group of UNFCCC, there has been no mandate through the government for national climate responses. Imported into the country by various types of organisations, external climate knowledge has become a tool and a condition for enhancing climate adaptation, and for guiding the long-term development of local communities, as shown in several developing countries (Orlove 2009; Weisser et al. 2013). Below I discuss the encounters and interrelationships between diverse kinds of weather and climate knowledges, especially the social processes that result in knowledge differentiation and inclusion/exclusion.

As discussed in Agrawala (1995), it would be misleading to put different ways of knowing into binary opposition – local, global, scientific, indigenous and traditional, or to compare or place one of these forms of knowledge over another. All forms of

knowledges, for example, tacit knowledge of lay Nan farmers and scientific knowledge brought in by ‘expert’ staffs of the German government, are equal because, as Donna Haraway (1988) puts it, all knowledge is embodied and partial; all knowledge is situated. How each group perceives other knowledges is culturally relative and subjective (Sillitoe 2007). Such categorisations and the attribution of superiority are not premade; they are a result of certain social practices.

The concept of ‘boundary work’ (Gieryn 1983; Gieryn 1999) provides a constructivist explanation to such phenomena observed in Chapter 8. A scientific institution, for example, produces and articulates its own language, values, and practices to justify and create a boundary which asserts and preserves its own authority and which distinguishes others as less or as non-scientific (Gieryn 1983; Jasanoff 1987). The boundary is socially constructed and is politically charged. Ingold and Kurtilla (2000) illustrate in their study in the Finnish Lapland how situated and heterogenous knowledges and contexts, including life histories, weather memories and moral solutions were often excluded from a climate project and treated as inexpert relative to scientific meteorological knowledge. A similar situation is found in the case of Thailand’s politics of the environment (Forsyth 2004) where authoritative environmental knowledge and narratives play important roles in statemaking and in attributing specific ideas of blame, responsibility and behaviour. This results in the legitimisation and delegitimization of the knowledges of different groups (Forsyth & Walker 2008, p.231). Through the social practices of knowledge differentiation and exclusion, experts and authoritative institution are able to maintain their resources, credibility and competence in decision making processes (Jasanoff 1987).

In Chapter 8, I have shown among the three categories of organisations operating in Thailand and Southeast Asia how climate-change was ‘translated’ (Callon 1986), naturalised and universalized to convince lay Thai villagers of its exclusiveness and legitimate ‘truth’. The two groups or organisation ‘climate service providers’ and ‘climate policy facilitators’ had, to varying extent, the strongest resemblance to Miller’s (2004b) description of the Empire where scientific claims were prominent over local knowledge, while ‘climate story listeners’ offered a hybridised knowledge space for enactments of multiple weather ontologies (Eden 2010; Goldman et al. 2015). In this latter case, Jasanoff (1987) argues that rather than seeing one set of knowledge

inherently possesses privilege qualities over another, it is the organisations' worldviews and their situated practices that co-produce the status and authority of knowledge.

Building on from boundary work, Jasanoff's 'idiom of co-production' (2004) states that institutional arrangements and categorisations that are finally used for ordering the society cannot be separated from the envisioned social order that a particular group has in the first place. And at the same time, identities and worldview of actors in the society informs how the institution should set up. In my research, I observed that external organisations, as well as local stakeholders, had creatively articulated 'ideas' about changes in climate that were invested with deep meanings, in order to persuade others according to their interests. Changes in climate were framed variously as 1) a sudden large-scale phenomenon that Thai people needed to face, 2) a result of the present society's departure from the utopian Thai-ness of the past, 3) an opportunity for (rethinking) development of places and people, and 4) an aspiration for social and political justice. These loosely match with Hulme's four myths of climate-change (2009): Apocalypse, Eden, Babel and Jubilee, respectively. Beyond the mere physical changes of climate, these different narratives ask what changes in climate *mean* for people and, conversely, what they want to achieve for their societies by using the idea of climate change (Hulme 2009).

Implementing these worldviews and imaginations requires standardized tools that travel across space as an immutable mobile (Latour 1987) and mediate the boundaries between subject and object, local and global, science and morality, and nature and culture. I have shown in Chapter 8 how ideas were realised through social practices: linguistic 'translation' by using technical terms; applications of visual technologies, numbers and graphs; installation of technological devices such as auto-weather stations; and circulation of written policy and rounds of meetings to meet the demands of global, national and local climate policy. In other words, through these material and discursive practices that took place at local sites, boundaries were constructed to delineate local Thai knowledge about the weather from scientific knowledge about global climate before these knowledges were subsequently joined up, compared, and made malleable to one's interests.

Despite the potential of local NGOs to offer a hybridised knowledge space, one of the project goals in organisations such as CCKM, MARCC and TEI, was to install and operate auto-weather stations for enhancing weather predictions and adaptation aimed

at Thailand's agricultural sector. This idea was also strongly put forward by Researcher v2. Their vision of a systematic, grid-like layout of 'the machine' across the countryside perhaps reflects control of the weather-world through what James C. Scott calls a high-modernist ideology (Scott 1998, pp.89–90). This ideology is a symbol of the state's, or in this case 'the Empire's', confidence in scientific and technical progress, as well as belief in the control of social and natural orders. In Thailand, the dominance of science-informed policy is not surprising. It has been influenced by the colonial and missionaries' quest to manage heat in 19th Century (Chapter 3), as well as Thailand's elites' quest for 'civilization' since the beginning of the 20th Century (Winichakul 2000) – the determination not to fall behind or below Western societies. In the 21st Century, the country has witnessed a comparable national and global institutional quest to manage not just heat, but also the chaotic global climate.

Perhaps the organisations' staff and experts visits to the countryside can be considered an extension of the hegemonic power and knowledge of 'the Empire' (Miller 2004) to enrol lay villagers into 'the Empire's' network (Callon 1986) within which their local weather stories become externally accountable and governable (Scott 1998). In the context of Thailand, air is probably the latest example – among other natural resources governance like forest conservation (Forsyth & Walker 2008; Stott 1991) and water resource management (Blake 2012; Sangkhamanee 2010) – that has become subject to the coupling of Thailand's technocratic state, and science-driven government, local and international organisations (Fahn 2003; Parnwell & Bryant 1996). Power in these studies is described as flowing from the core to the periphery, to make the latter governable. Forsyth and Walker (2008, p.29) put it that: 'extending the power of the lowland *maung* [core] into the upland forest [periphery] has been a key aspect of statemaking in modern Thailand, and various forms of scientific knowledge have been marshalled in support of this bureaucratic effort'. This linkage and extension of the Thai government's control from the lowland city to upland forest, and then to the sky, is clearly illustrated in the case of the deforestation-maize-haze-global warming narrative (Chapter 8 Section 8.2.3). This, in turn, puts lay villagers in Thailand at the periphery of climate knowledge production, which is dominated by what Jasanoff (2015) calls technocratic sociotechnical imaginaries.

In many cases, local villagers conformed to the climate facts and ideas of respective climate projects. This is evident in the villagers' ability to, voluntarily and involuntarily,

use technical terms ('Lok ron' and 'Karn Plien Plang Sapab Pumi Aagad'), choose appropriate adaptation strategies and engage in environmental-political movements. From the organisations' perspective, these actions indicated the success of their projects. However, this does not mean that lay people are passively losing out in environmental debate because traditional knowledge is erased by the all-encompassing expansion of modernity. The idea of hierarchical power as well as the constructed boundary is never static. Jasanoff's idiom of co-production helps to understand that rather than the dominating hierarchical power relations, there are instead historical and contextual micro-processes through which power is diffused and undergoes changes (Jasanoff 2004, p.53). A local site such as an upland forest or rice field becomes a place where power, authority and dominance of knowledges can be contested, transformed, destroyed and re-created among multiple stakeholders. This takes place around the deep-rooted dichotomy between the core-periphery, city-forest, lowland-upland, city dwellers-farmers, local-scientific knowledges and so on (Forsyth & Walker 2008; see also Santasombat 2008). Below show examples where dominating power is practically and symbolically contested.

As shown in the cases of GIZ and CCKM, local stakeholders resisted and negotiated with the organisations' original plans, showing the limit of the overarching power. In the case of CCKM in Yasothorn province, by willfully learning how to use ordering devices such as auto-weather station and weather maps, local villagers were able to assert themselves as investigators of the black-boxed weather forecasting system. They empowered themselves and became less dependent on expert knowledge. Similarly, the Nan highlanders adopted the identity of indigenous people and used the scientific term 'climate change' to counter blame that was put upon them by the state. As with many 'climate story listeners', their educational activities were, at a certain extent, aimed at blurring boundaries between local and global knowledges, and lay and expert. Through mundane practices, too, different groups were using power of science or the labelling of otherness that were given towards themselves to counter that very same power, to facilitate *their* sociotechnical imaginaries, empower *themselves* and to gain certain advantages (Jasanoff 2004, p.281).

Gieryn's concept of boundary work helps to understand that different kinds of knowledge initially co-exist, but the authority, privileges and contestations of these knowledge are part and parcel of ontological politics that aim at separating and

excluding others. Power can also be turned against, as my Muang villagers have also gone through the very same social practices that have created boundaries, in order to gain advantage from their existing knowledges. To deconstruct these boundaries and power relations, scientific knowledge needs to be seen as fitting a broader characteristic of knowledge, namely as emergent from specific human practices in particular places, just like the knowledge of hunters and gatherers (Ingold 2000). The focus turns instead to the embodiment, practices and situatedness of *all* knowledge production and the resulting boundary work that allows difference to be both recognised *and* worked with constructively (Haraway 1988; Jasanoff 1987).

The next section considers what mechanisms could possibly allow for multiple groups to fully and equally participate in decision-making process.

9.2.3 Plurality of Knowledges and Community-based Adaptation

Stories from the Thai villages demonstrate that neither nature nor weather should be seen as purely natural. In his work, Latour (1993; 2005) argues that the belief that we live in the world of a socially constructed single Nature (mononaturalism) understood by diverse ways of seeing it (multiculturalism) is false. On the contrary, by dissolving binary boundaries there is one shared culture-nature world (monoculturalism), not multiple worlds (Ingold 2016). For Ingold, it is continuously experiencing, knowing and becoming with the world that gives rise to differentiations in ways of knowing about it (multinaturalism) (Ingold 2016, p.303). In this case, there are multiple local weather stories constituted in and by all people who live in a single culture-nature world.

So far, this thesis has shown that the same weather is differently lived by farmers, studied by scientists, and re-interpreted by various kinds of organisations. Each group has their own way of understanding their weather and imposing order upon it. The weather and the constructed idea of climate transcends the boundaries of the natural and social, local and global, material and imagination, lay and expert and so on (Fleming et al. 2006; Hulme 2015b). Weather and climate are also invested with human ideologies, politics and practices (Jasanoff 2010), hence becoming malleable, multiple and mobile. Because of its hybrid, boundless and boundary-less nature, Hulme (2010a) proposes to think of climate as cosmopolitan. There are, then, what Blok (2010) calls, many 'situated globalities'. For these complexities, Fleming and colleagues, in their book *Intimate Universality*, describes that today's 'atmospheric phenomena are at once unreachably distant and unavoidably near' (2006, p.ix).

I have already introduced above the interaction between different types of knowledge, and showed that the status, validity and authority of these knowledges are socially constructed. By seeing knowledge as situated and understanding the limits of each type of knowledge, is there a possibility for integrating different kinds of knowledges? In the context of integrating instrumental with indigenous weather observations, authors like Reyes-Garcia (2016) and Savo et al. (2016) are optimistic that the fine-scale and place-based traditional weather knowledge could add richness in places where there is a lack of instrumented stations. Lebel (2013) also adds that flexible institutions, cross-scale linkages, and co-production offer opportunities for sharing and learning knowledge for adaptation in Asia Pacific. Some authors are more pessimistic about this direction, because of the politics of knowledge. Integration, argue Klenk and Meehan (2015), masks the inherent friction and unequal power relations in knowledge co-production. Scientific institutions and climate organisations, therefore, need to be more reflexive in terms of their own practices, recognising ontological and epistemological pluralism, and questioning the possibility of integration (Hulme 2015b). This helps to make sure that certain knowledges that matter (e.g. bodily, spiritual and cultural) are not excluded, misinterpreted or lost, and are fully used in addressing the project's problem (Adger et al. 2012; Orlove 2009). Furthermore, Strauss (2012) argues that, whether or not the 'local' is changing, and whether or not places and people are endangered, the voices of interpretation should come from the inside.

The above optimism, criticisms and recommendations for knowledge integration can be further discussed in the context of weather forecast and community-based adaptation. More than recognising the diversity of knowledge, mechanisms are needed for accommodating multiple sources of knowledge in decision-making process by default.

For science-based organisations like the climate service providers, more than knowledge integration is the need to reposition the role of lay and expert in the process of risk management and decision-making (Lane et al. 2011; Mahony & Hulme 2012; Miller 2004b; Winarto et al. 2011). This is not to suggest that villagers be trained to be more competent in computing and weather forecast tools like in the case of CCKM. On the contrary, it is to allow lay knowledge to interrogate black-boxed scientific knowledge, and to allow local weather language and knowledge to be expressed freely, with help from organisation practitioners as suggested by Researcher v1. These

activities can help dismantle boundaries between knowledges, and generate a co-produced knowledge that is ‘particular’ for a site. In addition, the tendency to favour and rely on the ‘perfect’ weather forecasting technology needs to be curtailed. In parallel with arguments in Section 9.2.1, Jasanoff (2007) instead proposes another kind of technology, a technology of humility that looks to find moral foundations and ethical solutions first, before asking for more facts. Understanding people’s intersectional identities and social networks, and their believed sources of vulnerability, *before* installing a weather station helps provide greater legitimacy and credibility for agrometeorological climate services (Carr & Owusu-Daaku 2015).

For policy and development-oriented organisations like the climate policy facilitators and story listeners, their works are relevant to the concept of community-based adaptation (CBA). CBA can be used as a guideline and assessment – albeit with some remaining debates – for achieving participatory adaptation process and resilience within at local level (Forsyth *in press*). Community-based adaptation is defined as a form of adaptation planning within the approach of development planning that focuses on the needs and participation of local people who are vulnerable to climate change (Forsyth *in press*). More than just a development project, CBA supports integration of diverse experiences and understanding of risks, and allows multiple groups, each with different kinds of expertise and community goals, to participate in design and implementation of climate adaptation strategy in a way that puts development first and before climate (Forsyth *in press*).

As argued in this thesis, M villagers and many other resource-dependent groups in Thailand, for example in Forsyth and Evans (2013), have coped and adjusted their livelihoods through seasonal and climate variability based on local customs and knowledges rather than to anticipated long-term changes in future climate based on model prediction; But from the perspective of CBA, which aims at ‘designing institutional processes that can consider local needs and global climate changes simultaneously’ (Forsyth *in press*), current coping strategies against short term variability is not enough. Large-scale and long-term interventions are needed to address and alter local socioeconomic, environmental and political factors that have initially led to vulnerability of the community (Ayers & Forsyth 2009). In this case, global climate projections and the idea of climate adaptation with development purpose can be added to existing knowledge and interpreted from the perspective of a community. Indeed,

integration has been a compelling argument from organisations in the three groups, especially JK, RECOFT, MARCC and GIZ, but they had different ways of integration, and never explicitly mentioned any association with the term community-based adaptation.

From my observations and data, I fully support the idea of long-term development planning. But I also believe that more fundamental work needs to be done to ensure that existing place-based knowledges are preserved and included in the process of knowledge integration. This concern stems from the fact that pre-existing knowledges and practices of adaptation to climate variability are not counted as successful CBA because it is not based on anticipation to projected future climate (Forsyth *in press*). Before informing the future changes in climate in 2050s, organisations should take time to understand what variability and changes in weather and climate historically and culturally mean for each community, especially agricultural society in poor countries where seasonal weather variability matters most to their livelihoods. I argue that this pre-existing knowledge used for maintaining livelihood and dealing with climate variability is the foundation for knowledge used for dealing against long-term changes in climate, and it is hard to separate the two. I suggest that adaptation to climate variability be included in CBA's methodology and assessment.

It would be unrealistic to hope that teaching scientific information alone would change Thai people's predominant fatalistic worldview to an egalitarian worldview, a recommendation which Suthirat and Takashi (2013) argue would allow lay people to better engage with pro-environmental behaviour. This stance would maintain the (alleged) superior status of climate knowledge and policy. To the contrary, I argue that knowledge pluralism is important for adaptation at local level. More than that, it is rethinking power relations between organisations and villagers and giving voice to the most disadvantaged groups and locations (Forsyth *in press*). These processes toward inclusiveness is time-consuming, as demonstrated by the work of RECOFT, and this is a disadvantage of CBA. But by being open to different definitions, interpretations and processes of adaptation, the time invested is therefore an opportunity for learning and for an open debate for co-shaping what kind of adaptation different groups want, for who, and how it needs to be achieved (Forsyth & Evans 2013).

Adopting CBA as a guideline helps rethinking and repoliticising climate institutions by questioning and challenging the dominance, relevancy, narrowness and practicality of

IPCC's predetermined narrative of climate adaptation at local level. CBA makes it easier to ask, 'who defines climate risk and the factors that lead to vulnerability?', and to define how the risk should be responded to. In a wide-picture of integration and representation of knowledge, the IPCC fails to represent and engage with alternative forms of expertise, as well as with the historical and contextual complexities of local experiences to changes in weather and climate (Ford et al. 2016). The IPCC operates as a hegemonic and closed-system (Beck et al. 2014), as a manifestation of 'the Empire'

On the other hand, the IPCC could learn from the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), which is relatively broader and inclusive of a wider range of stakeholders and multidisciplinary experts without these groups and knowledge being judged by peer-reviewed literatures (Beck et al. 2014). In the next assessment of the IPCC (AR6), Ford and colleagues (2016) propose that there is a specific chapter lead-authored by a team of local experts, indigenous scholars and NGOs to shape to content, collect and synthesize knowledge, especially tacit weather and climate knowledge that is passed on through oral histories. I propose that these new directions also be adopted by Thailand Climate Change Master Plan, as well as by the Thailand Assessment Report on Climate Change. Such institutional reflexivity would address the politics of knowledge pluralism and integration, and help form platforms for more robust climate adaptation at local scales.

9.2.4 Language and Communication

Findings from Chapter 7 show that in Village M each season has its own narrative and metaphor, which are related to moral responses. It is then possible to establish that understanding vernacular languages of weather and its meanings can shed light on ways of responding to (in)appropriate changes of weather. But as shown in Chapter 8, imported technical terms like 'lok ron' (global warming) or 'karn plien plang pumi aagad' (climate-change) redefine the ways of understanding and responding to changes that favour the organisations' preferred approach (e.g. zero burning or agrometeorological weather service). In the opposite, villagers and partnering organisations are also beginning to make use of these new terms, for examples, as new narratives for climate actions and local political movements. More work is needed to explore these new interpretations of weather and climate

Standardisation and localisation of knowledge through language in Thailand is not new. In written records, the words 'nature' and 'natural environment' did not exist in Muang

language (Davis 1984, p.85; Khanittanan 1989, p.234). The word ‘nature’ was introduced under the European influence in central Thailand during the late nineteenth centuries (Davis 1984: 85). Similarly, Jiraprasertkun (2015) finds that the Thai translated versions of such Western terms as ‘space’, ‘place’ and ‘landscape’, convey only physical, geographical and visual qualities. This contrasts with the Muang conceptualisation of place in which nature, culture and spirit are intermingled, and in which the mental aspects of place is put ahead of the physical aspects (Jiraprasertkun 2015, pp.107–108). The removal of subjectivities from the Western concepts makes the translated Thai version of those concepts only partially comprehensible to Muang villagers (see also chapters 9, 10, 12 in Ingold’s (2011)’s work. As a result, from the perspective of Thai landscape and architectural design, Jiraprasertkun (2015) proposes that these translated concepts be re-examined from Thai cultural and spiritual perspective. The implication of this in context of climate change is that, as Nerlich et al. argue, comprehending the deeper meanings of vernacular language can improve climate communication (2010, pp.106–107).

A similar argument could be mentioned in terms of climate narratives. There are promising opportunities given the ‘corroboration potential’, and promiscuous translation, of climate-change (Rudiak-Gould 2012) in the Thai language. For example, changes in weather and climate can be communicated through storytelling in relation to local landscapes and histories as recommended in Matless (2016). This would be similar to what MARCC and RECOFT did. Or the term ‘lok ron’ can be linked to the moral intuitions of people to help motivate greater responses (Markowitz & Shariff 2012). Despite non-local organisations creating four framings of climate narratives (see Section 9.2.1, p.228), they have failed to examine if these framings could take advantage of existing lay worldviews (see Section 9.2.1, p.224–26). It shows their communication strategies as superficial and unreflexive. In contrast, successful communication and response strategies are demonstrated by local stakeholders in Nan province in the third and fourth points outlined in ‘Lessons from Village M’ Section above (9.2.1).

The haze pollution-global warming narrative shows, if only superficially, the successful merging between local and global environmental problems and public engagement (Chapter 8 Section 8.2.3). Nevertheless, communicators need to weigh carefully the trade-offs between cultural and linguistic familiarity, scientific accuracy, as well as examining the role of exogenous environmental narratives and politics.

9.2.5 Representativeness and Impact of the study

I began Section 9.2 with the call for reintroducing particularity in current climate studies. The core of my thesis looks at the importance of place and space as sites of knowledge production, circulation and reception. Place is a context for a cultural way of perceiving the weather and imagining climate. Following Livingstone (2012), this situatedness of weather and climate – or of people’s weather-worlds – cannot be ignored. As Livingstone (2012 p. 2-3) emphasises ‘the significance of understanding very particular temporal moments in very specific venues if we are to grasp the just how communities form their impressions of climatic realities’. In Chapter 3 I selected a group of Tai Yuan ethnicity who live as subsistent glutinous rice and fruit grower in a mountain-valley landscape of Nan in order to crudely represent how people who share this culture in northern Thailand and those beyond the border of Thailand (Laos, Vietnam and Southern China) perceive their weather (although I am aware of the differences among ethnic groups). Furthermore, it is the shared animistic belief system that makes their perception slightly different from the general Thai (say from Central Thailand) who are not traditionally animists. This resulted in revealing some of the salient moral and spiritual dimensions of this group’s conception of nature, including the weather.

Despite the potential of using Tai culture to represent parts of insular Southeast Asia, the perception of weather is also largely governed by individual, social and topographical complexities even within close geographical locations (compare my own personal Chiang Mai and Nan experiences): age, behavior, occupation, housing infrastructure and other social values. It could then be argued that there are very likely to be a multiple – or perhaps infinite – number of ways of knowing weather within northern Thailand alone, and also within Thailand as a whole country: the Chiang Mai officer worker way; the Bangkok officer worker way; the Nan farmer way; the Southern fishermen way, and so on. In other words, an attempt to generalise weather perceptions and meaning using cultural and belief systems fails to fully capture these very fine-scale contextual factors. The same argument goes for an assumption that the global or down-scaled temperature projection means the same thing for people in the grid map (Hulme et al. 2009; Geoghegan & Leyshon 2012; Rice et al. 2015). In addition to knowing the future climate impacts, I argue for using qualitative studies to reveal contextual and humanistic factors of weather. In this thesis, these factors are structured through

themes of place, meaning and knowledge in order to create a space for multiple epistemologies of weather in a decision-making process.

My ethnographic study from a small village from northern Thailand contributes to the argument for adaptation at local scales to be aware of the missing cultural dimension and to regard the importance of participatory process. These points are not only emerging in the field of climate change studies in Thailand; they are also, very vaguely, mentioned in the long-term Thailand Climate Change Master Plan and should be emphasised further. I have also argued using the principles of community-based adaptation that adaptation projects be considered as a long-term development projects with added climatic factors. This fundamentally requires a local adaptation project to be driven by voices and actions of people in the community, rather than by policy frameworks or by science (Forsyth, *in press*). This is to avoid political goals and scientific knowledge dominating decision-making process and stigmatising local knowledge as static and inferior. These recommendations are not new for environmental and development issues in Thailand as documented in Forsyth and Walker (2008), but need repeating. Failing to do so would make air and the weather yet another natural resource that suffers from the politics of statemaking, just like other natural resources before. It would also mean that the Office of Natural Resource and Environmental Planning and its Climate Master Plan, which is strongly influenced by GIZ and IPCC, are not yet a fully open and inclusive institution and policy.

9.3 Contribution to Current Knowledge

9.3.1 Human and Cultural Dimensions of Climate-change

Over the past decade, there have been calls for the decentring of climate change research away from a primarily scientific perspective to give the opportunity to humanities and social science scholars to make a greater contribution (Castree et al. 2014; Hulme 2011a). My study of a small village in northern Thailand contributes to this decentring by investigating how ‘climate knowledge is known, remembered, experienced, embodied, practiced, made and modified in the context of everyday life’ on familiar farming landscapes (Geoghegan & Leyshon 2012, p.57). And specifically in terms of morality (see Hulme 2014), I have shown how worldviews, religious beliefs and emotions affect cultural responses to changes in climate, an area which has been lacking in studies as put forward by Adger et al. (2012). I have also described the

mobilization of climate knowledge and ideas, and its differential acceptance and resistance (Hulme 2008, p.9) in the context of Thailand.

Following Livingstone's recommendations (2012), I have: 1) *particularised* climatic experience by demonstrating Muang perceptions and ways of responding to changes in their mundane weather and seasons; 2) *problematised* knowledge by using voices of local people to interrogate voices of external organisations' staff. I have given the space and right for both to speak; and 3) *pluralised* the meanings of climate from lay and expert perspectives. Here, I recognize the different ways in which climate knowledge and climate meanings are articulated through different people, cultures and practices. The uniqueness of this thesis, therefore, is that I have woven together these three related research ambitions into one piece of grounded research.

As a geographer, my work responds to Hulme's (2008) encouragement for geographers to reveal the emergent relationships between human cultures and climates in particular settings. The findings from the thesis contribute to growing literatures that emphasise concepts of place and landscape, in relation to weather, changes in climate and climate-change, as well as those literatures that reveal the external flows and circulations of climatic knowledge and power. Examples here include the work of Brace and Geoghegan (2011), Burnham et al. (2015), Forsyth and Evans (2013), Head et al. (2011), Leyshon and Geoghegan (2012), and Rice et al. (2015). My work also contributes to the recognition of ontological and epistemological pluralism exemplified by Goldman et al. (2015), Hulme (2015b) and Popke (2015), and more broadly on nature and culture of Descola (2013), Ingold (2000; 2011) and Latour (1993). Unique in the context of non-Western views of climate has been my emphasis on the roles of language (Nerlich et al. 2010; Rudiak-Gould 2012) and morality (Byg & Salick 2009; Donner 2007; Hulme 2014; Leduc 2014; Rudiak-Gould 2012). Implicit in this thesis is the role of gender in environmental change issues (Mustafa et al. 2015; Nightingale 2006; Tschakert et al. 2013). The gendered division of labour in agrarian society does affect how the weather is perceived. This area deserves more investigation.

In a broader sense, this thesis searched for the missing cultural dimension that might improve decision-making in current climate adaptation, as raised by Adger et al. (2012) and Krüger et al. (2015). It adds to the field of social sciences and humanities by offering another study that presents 'values-means-ends' packages (Castree et al. 2014) that can bridge with the field of global environmental change research.

My qualitative study in a small village in northern Thailand shows how changes in weather and climate are deeply engrained in the context of everyday activities such as showering, wearing clothes, sleeping, travelling, gardening and farming, and so on. The Tai Yuan villagers at Village M understood and responded to these changes culturally in the context of their life experiences (Hulme 2015a), rather than as reactions to a new set of knowledges introduced by external agents. Weather and climate knowledges, then, are place-based and culturally distinct. Methodologically, therefore, small scales and deep meanings are needed.

9.3.2 Contribution of Research Frontiers in Thailand

My emphasis on cultural and religious beliefs, and emotions, as well as mobilisation of global knowledge is relatively new to the very limited existing studies on human and cultural dimensions of climate-change studies in Thailand. Most studies are based on the framework of 'holistic' place-based adaptation and vulnerability studies that involves climate modelling and community assessments in water resource and agriculture sectors. My work therefore, takes a more humanistic and cultural direction in terms of approach (anthropology, geography, STS), as well as methodology (ethnography, photo-elicitation). More importantly, even though social sciences and anthropology disciplines in Thailand only rarely conduct research on climate-related themes, existing concepts and methodology are fruitful and applicable in this context. See for example, Darlington (2014) and Santasombat's (2008) work on cultural dimension of (climate) adaptation among farmers; or Blake's (2012), Forsyth and Walker's (2008) and Sangkhamanee's (2010) studies on knowledge construction and governance of Thai natural resources.

In a broader sense, the non-modern and fluid ontology emphasised in this thesis adds richness to the small but emerging group of Thai scholars who are readers of Bruno Latour's work (see edited book in Jaroensri (2016)). What may not previously have been explicitly emphasised among Thai scholars is Ingold's concept of the weather-world.

9.3.3 Methodology and Research Design

Qualitative methods from anthropology and ethnography used here help to illuminate climate-culture relationships (Barnes & Dove 2015; Roncoli et al. 2009). The qualitative data I gathered could not be captured through semi-structured interviews or by climate

models. 'Being there', as shown in Chapter 5, helped to capture the lived experience and cultural meanings and practices that defined Village M and the way people perceived, understood, experienced and responded to changes in local weather and climate (Roncoli et al. 2009, p.89). 'There in the fields, through a phenomenological approach, I attended to the movements and co-becoming of human and nonhuman constituents with the weather and seasons (Country et al. 2015). I did not carry out the fieldwork in the role of a climate organisation staff member nor as an expert from an external authority. I did not enquire about their weather knowledge using surveys or check-lists. Instead, through narrative enquiry, and without imposing my status or knowledge, the participants and I helped co-produce acts of knowing and telling stories about the weather of Village M (Paschen & Ison 2014).

The design of this research was also crucial to the success of its outcome. I started interviewing external organisations only after I had familiarised myself with the community, people and their local weather stories. This was because I needed the lay perspectives to be able to interrogate the dominant power and knowledge held by the organisations. This also avoided the organisations' climate approach and framework influencing how I carried out my research in Village M. The only significant problem in the field was the photo-elicitation process. The low rate of response was probably due to the number of photographs (too many), and to the angle of the camera (wasn't different from what they normally saw in daily life).

9.4 Future work

The strengths of this piece of research lies in its *depth* of enquiry into one full annual cycle of local weather and seasonal farming, and its *breadth* in comprehending different types of climate organisations operating in Southeast Asia. One could argue that more focused studies of specific groups, places and events could be carried out as an extension to this existing work. I would propose the following:

1. An extended ethnographic study on Joko's work in Village M. As mentioned in Chapter 8, Joko's use of climate knowledge in farmer field school had been delayed until early 2015. An in-depth study of the organisation itself, and the practices, mobilisation and networks of climate knowledges, as well as the reactions and responses

by M Village farmers, would significantly complement findings from Chapters 7 and 8 (see in Sangkhananee (2010) and Mahony and Hulme (2012)).

2. A study on relational geography of weather and climate in a given event. Following the study of Goldman et al. (2015), a case study of specific extreme weather events such as drought in 2015 followed by flood in 2016 in Nan, would help to understand the different kinds of spaces and times in which weather and climate are understood and mobilised. These form different realities of weather and climate that are articulated by different groups of stakeholders

3. A study on the origin of the haze pollution-global warming narrative. So far, there has been very limited study of the linkage of forestry and air resource governance that is specific to northern Thailand. This could help illustrate the broader pattern of how air is to be governed in the future in relation to other natural resources, and under the National Climate Change Mast Plan.

4. A historical geography and STS study on the meteorological and climatic knowledge in Thailand. As mentioned in Chapter 8, Western scientific knowledge on oceanography, irrigation and meteorology was brought to Thailand by a Thai prince who studied in a naval college in the UK (including colonial visitors and missionaries) in the beginning of 20th Century (see also Sangkhamanee (2010)). The import of external knowledge occurred at a time when Thailand was opening up and searching for modernity (Winichakul 2000). A historical study would provide a unique understanding of how Western knowledge, especially of meteorology (Fleming et al (2006) has redefined Thai conceptualisations of nature and weather, and how Thailand has become a part of British epistemic imperialism and scientific internationalism (Mahony 2016).

5. A study on regional climate communication. As noted above, each region of Thailand has a specific understanding of its own weather, let alone a comprehensive study of what the weather means for Muang people of northern Thailand, culturally, historically, emotionally and spiritually. There is also a lack of climate communication strategies that are tailored for changes in the weather of northern Thailand. The images used in local or national media (O'Neill 2013) and climate languages and framings (Ereaut & Segnit 2006; Nerlich et al. 2010; Moser 2016) in the Muang context deserve further investigation.

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Appendix A: Ethical Clearance from King's College London

Below is an email confirmation from King's College London that my research has been approved of ethical clearance.

Dear Chaya,

I am pleased to inform you that your research ethics application REP(GSSHM)/13/14-4 'Experiencing and performing in the field: how do Northern Thai farmers make sense of weather and climate change' been reviewed by the GSSHM REP and has now been FULLY APPROVED with the following provisos:

- The Panel advises that you discuss any potential safety issues with your Supervisor and take the necessary precautions if interviewing participants alone, particularly in their own homes. It may also be helpful to read through the following safety code:

http://the-sra.org.uk/sra_resources/safety-code/

- 2.6 The Panel advises that you complete a Risk Assessment Form within your department before commencing data collection. Please discuss this with your Supervisor.
- Information Sheet: As outlined in section 7.3, please establish clearer boundaries regarding the level of illegal disclosure that will require you to take further action.
- Information Sheet: Please be clearer that you are researching the use of khat and refer to khat specifically rather than 'substance' where relevant.
- 10e Please consult with KCL guidelines to establish the appropriate location and length of time for data storage following completion of the study.

The panel requests that you make the above changes to your application but will not require evidence of these changes. I have copied in your supervisor so that he may oversee these amendments. Attached is a copy of your letter of full approval. If you require a signed copy of this letter please do not hesitate to request one from me at the address below.

Best Wishes,

Dan Butcher

Senior Research Ethics Officer

King's College London

daniel.butcher@kcl.ac.uk

Appendix B: Consent Form

CONSENT FORM FOR PARTICIPANTS IN RESEARCH STUDIES



Title of Study Experiencing and knowing in the field :how do Northern Thai farmers make sense of weather and climate change?

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

**Please tick
or initial**

- I understand that if I decide at any time during the research that I no longer wish to participate in this project, I can notify the researchers involved and withdraw from it immediately without giving any reason. Furthermore, I understand that I will be able to withdraw my data up to the point of publication
- I consent to the processing of my personal information for the purposes explained to me. I understand that such information will be handled in accordance with the terms of the UK Data Protection Act 1998.
- The information you have submitted will be published as a report; please indicate whether you would like to receive a copy.

Yes	No
- I understand that confidentiality and anonymity will be maintained and it will not be possible to identify me in any publications for explain the possible anonymity options that you are offering participants and provide appropriate 'Yes/No' tick box options accordingly.

Yes	No
- I agree to be contacted in the future by King's College London researchers who would like to invite me to participate in follow up studies to this project, or in future studies of a similar nature.

Yes	No
- I consent to my interview being audio/video delete as appropriate I recorded.

Yes	No

Participant's Statement:

I _____

agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information Sheet about the project, and understand what the research study involves.

Signed

Date

Appendix C: List of Participants at Village M

Below describes each participant's 1) role and affiliation at Village M, 2) their relationships with myself as a research in and off the field. The names below are pseudonym. There were eight key informants out of 35 participants selected. This excludes the two gatekeepers, Ing and Jai, who were treated as representatives of organisations.

Prior to conducting the research, I asked for permission from Jai and Min, the Chief Executive of Muang Chang, and the headman of Village M, respectively, to talk to villagers as part of my research study, following the King's College London's research ethic protocol (see Appendix A and B). They both agreed. When approaching the villagers, I also introduced my overall objective of study – to learn about their livelihood and the weather – and they were willing to participate. I as assured them the confidentiality and anonymity of the data.

Household members Name, gender/age range	Role/title/affiliation	Description and relationship	Key informant
Ing, F/40s	Researcher at Joko Learning Center; PhD student at Chiang Mai University	Gatekeeper. Very helpful in introducing me to participants and organisations	Yes
Jai, M/50s	Chief Executive of Muang Chang Sub-district Administration Organization; PhD student at Chiang Mai University Former director of Joko Learning Center	Gatekeeper. He gave me permission to study in the Village and stay at the Village's old hospital.	Yes
Min, M/50s Mali, F/60s	The village headman (Min), Both were members of the Farmer school project;	Min gave permission for me to study the Village and stay at the Village's old hospital.	Yes

Appendix C: List of Participants at Village M

		I often visit this family I often consulted Min and Mali on farming management and general affairs about the village. Mali is the mother of Min's wife	
Rin, F/40s	Assistant Village headwoman; Member of the Farmer school project; Member of the Pig Farmer group; Head of forest protector group; Village committee	Known as the 'modern farmer'. Very close relationship. and I participated in her farming activities very often Rin also recorded and narrated some videos for me.	Yes
Nam, F/50s Nong, M/60s	Village's blacksmith (Nong)	My next-door neighbours . Close relationship .I occasionally dine with them .	
Dan, M/20s	A traveller student from Belgium	Stayed and learn farming life with Jai	
Ping, M/50s	Assistant village headman for a neighbouring village	Introduced me to upland rain-fed rice field .	
Fa, F/50s Po, M/50s	Members of the Farmer school project	Po, nicknamed 'Dr.Po' after his eagerness to attend workshops, share knowledge, and revive the forgotten traditional subsistent farming techniques. Favours setting up farm enterprise	Yes
Wan, F/60s Jan, M/60s Mek, M/70s	Village's wise man (Jan)	A family of brothers and sisters I often consulted Jan on Village's ritual ceremony and spirits. Mek was the eldest brother of the family, and the oldest working farmer in the Village)aged 73 in 2014.(I often dine with them, and they always gave home-grown	Yes

Appendix C: List of Participants at Village M

		vegetable and fruits to me and my family	
Dang, M/60s		Relative of Sai Often present during dining with Wan/Jan/Mek .	
Pree, M/60s Mai w, F/60s		Always present with other farmers like Mali, Fa, Po, Rin	
Kan, M/60s	Member of the Farmer school project, Village committee, Head of village security group	Very enthusiastic about organic rice farming Sadly, Kan was severely ill since early 2014. I only occasionally saw him since	
Lai, M/50s		Works for Joko's demonstration rice field	
Sai, F/40s Nat, M/50s	Member of the Farmer school project (Sai) .	Both were officially registered at a neighbouring village, Village S . But Sai was a relative of Rin and Dang, and member of the Farmer school project .So she often come and go between the two villages. Known as a 'modern farmer'. Sai were always very enthusiastic to take me to places and events . Very often I participated in her farming activities .Very close relationship Sai was known to have sixth-sense and fortune telling abilities.	Yes
Hong, F/50s Kob, M/50s Jee, F/40s Tot, M/40s	Food store owner (Hong)	Hong was Kob's sister .Part-time farmers and full-time restaurant owner .I always went to her place for lunch Jee is married to Kob .The couple were one of the Village's largest lychee producers Tot was Kob's brother, often presence at rice fields with Rin, Po and Pree	

Appendix C: List of Participants at Village M

		The four lived in two houses next to each other	
Pon, M/70s	Former village headman	Pon used to keep note of weather events .Unfortunately, after stepping down of village headman, he no longer kept his notebook .Strong and authoritative opinion,	Yes
Wai, F/50s Dam, M/60s	Village water committee	My next-door neighbours . Discussion on water management.	
Moo, M/40s	Member of the Farmer school project, Head of the Pig Farmer group, Head of forest protector group, Village committee	Known as the ‘modern farmer’.	
Tai, M/50s	Member of the Farmer school project.	Officially registered at a neighbouring Village S .She joined the Farmer school project, linked by Sai. Former teacher, good command of central Thai and English languages . Only presented in focus group and off-record socialisation	
Rak, F/40s Num, M/40s	Both worked for Joko and were members of Farmer school project.	Rarely met in the fields, but more often when working/visiting Joko .	
Lek, M/60s		Known secretly as ‘the rice expert’	
Dee, F/70s		Sai’s relative. Often engaged in rice activities	
Parn, F/40s	School teacher	Brief chat	
Nong, M/50s		Work for tobacco at Jee/Kob	
Lali, F/40s	Staff at Joko Learning Center	Often found her at Village meetings and events with Ing	

Appendix C: List of Participants at Village M

Ped	An officer at the Department of Land Reform, and a part-time farmer		
Tae		My neighbour. Often present with Rin and Nam	

Appendix D: Letter to Organisations

Below is a sample of an email written to an organisation to make appointment prior an interview to fulfil Research Question 3.

Dear _____

I'm a Thai PhD student at Department of Geography, Faculty of Social Science and Public Policy, King's College London, with my thesis entitled "Experiencing and knowing in the field: how do Northern Thai farmers make sense of weather and climate change?" I was introduced to your institution by Mr./Miss _____ and believed that I could gain more insight into your institution's perspective on climate change adaptation.

The purpose of my study is to understand the practice of adaptation projects undertaken by your organisation, and how you communicate climate change information to participants. To meet this objective, I would like to ask for permission to visit your organisation and interview your team members, perhaps one-on-one or a mini discussion group with a few participants.

Below are core interview questions:

- Why is the climate change an important issue for your institution
- What source of climate information is your work based on? (e.g. IPCC)
- how do you communicate the words 'climate change', and 'adaptation' to your participants?

I would like to ask for the conversation to be audio recorded, and this will be used only for the purpose of my study. I can assure you that the interview will be conducted professionally with informed consent, and that the interviewees have the right to ask questions, raise concerns or refuse to participate at anytime during the interview. Personal information of any individuals will be made anonymous to protect their identities.

Could I arrange an interview sometime between _____

If you have further questions please do not hesitate to contact me. Thank you very much.

Best regards,

Chaya Vaddhanaphuti

Appendix E: List of Organisations, Interviewees and Their Job Positions, and Interview Topics

Level of operation	Type of organisation	Organisation and abbreviation	Interviewee and position	Area of expertise
<i>Provincial</i> (Nan)	Thai Government	Agricultural Land Reform Office, Ministry of Agriculture and Cooperatives (Nan ALRO)	Voice 1 Field officer Voice 2 Planning officer, Senior level	Agriculture, livelihood, food security, climate change in Muang Chang sub-district, Nan
		Nan Municipality (Nan MUN)	Voice 1 Director of Nan Municipality Voice 2 Head of Public Health and the Environment	Environmental management in Nan Municipality Contribution to GIZ's climate change work
		Nan Office of Natural Resource and Environment (Nan ONRE)	Voice 1 Head of Environment welfare	Environmental management in Nan province. Contribution to GIZ's climate change work
		Nan Meteorological Office (Nan TMD)	Voice 1 Head of Nan Meteorological Office	Weather forecast Communicating weather and climate change
	NGO/non-profit	Joko Learning Center (JK)	Voice 1 Head of Research and PhD candidate Voice 2 Field officer and PhD candidate	Agriculture, livelihood, food security, climate change in Muang Chang sub-district, Nan
		The Regional Community Forestry	Voice 1 Project Manager	Forestry and community climate change adaptation in Nan

		Training Center for Asia and the Pacific (RECOFT)		
<i>National</i>	Academic /Research institute	Thailand Research Fund (Researcher v1)	Voice 1 Climate change adaptation Researcher	Climate change adaptation in Thai academic arena
		Chiang Mai University (Researcher v2)	Voice 1 Climate change adaptation researcher	Climate change adaptation in agriculture sector of Thailand
		Climate Change Knowledge Management (CCKM)	Voice 1 Project manager	Community weather forecast projects
	NGO/non-profit	Thai Environment Institute Foundation (TEI)	Voice 1 Field coordinator	Urban resilience and adaptation
	Thai Government	Climatological Center, of Thailand Meteorological Department, Bangkok (TMD)	Voice 1 Senior Staff	Short -and long-term weather forecast and climate data
<i>International</i>	United state-funded	Mekong Adaptation and Resilience to Climate Change (MARCC)	Voice 1 Knowledge Management and Communication Specialist Voice 2 Field Coordinator Voice 3 Monitoring and Evaluation Specialist	Vulnerability, Adaptation of agricultural livelihood in Lower Mekong regions

Appendix E: List of Organisations, Interviewees and Their Job Positions, and Interview Topics

	German-Thai government cooperation,	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)	Voice 1 Project coordinator Voice 2 Project Director	Implementation of National Climate Change Action Plan in Nan province
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Appendix F: Interview Questions for organisations

Semi-structured interview questions for all organisations)left column(, and for particular organisations)right column(

Core questions for all organisations	Specific questions for particular organisations and/or area of interest
Objective and activities of project	
Why is your climate change project important for your participants? Do you consider them vulnerable to current and future changes in climate?	[for Researcher v1 and v2] Can you tell me the history and future direction of climate change adaptation studies, especially in agriculture sector, among Thai scholars? How have concepts, methodologies, and diversity of disciplines evolve overtime?
What is the focus of your project :mitigation and/or adaptation?, and in which sectors (e.g. energy, city, forestry?)	[for Researcher v2, JK, RECOFT] How should northern Thai farmers adapt to future climate change?
Is it necessary for farmers to have their own weather stations for greater access of weather information and to enhance adaptation?	
The use of climate change information	
What is the source of climate change information and knowledge that your organisation use?	[for GIZ] How does the German expert approach climate change? Is it different from how Nan people and Nan municipality would approach?
What type of climate prediction is most suitable for your participants (weather forecasts, seasonal forecasts, climate projections?) Are they reliable? Do they contain high uncertainty?	
What are indicators that your participants cite for indicating changes in weather and climate?	
Communicating climate change	

Appendix F: Interview Questions for organisations

How do you communicate the terms 'global warming' and 'climate change' to your participants? What is the level of awareness of climate change among your participants?	
How do your participants talk about weather and climate change?	
Is there conflict between traditional knowledge and scientific knowledge?	

Appendix G: List of Conferences and Seminars Attended

Type of organisation	Organisations and participants	Title of event
Academic /Research institute	International Conference on Southeast Asian Weather and Climate	CONFERENCE International Conference on Southeast Asian Weather and Climate 2013 :ASEAN adapting to climate change 27 th -29 th November 2013, Chiang Mai
Academic /Research institute	Kon Kaen University Rice Department, Ministry of Agriculture and Cooperatives	WORKSHOP Strengthening farmer's adaptation to climate change in rainfed lowland rice system in northeast Thailand 31 st March-2 nd April 2014, Ubonratchathani)Northeastern Thailand(
Academic /Research institute	Office of Natural Resource and Environmental Planning)ONEP(, Thailand Development and Research Institute)TDRI(CONFERENCE Framework for short -and medium-term strategic action plan for national climate change management :Northern Thailand 28 th May 2014, Chiang Mai
Thai Government	Climatological Center, Meteorological Department, Bangkok	PRESENTATION Climate variability and climate change :meteorological knowledge and application 11 th November 2014, Na Sao village, Nan
NGO/non-profit	Thai Public Broadcasting Service Forum, Hug Muang Nan, Raks Thai	FORUM Holistic Natural Resource Management :soil, water, forest and natural disaster 27 th November 2014, Nan https://www.gotoknow.org/posts/581416